ENGINEERING NEWS-RECORD

Oceanfront building site poses problem p. 39

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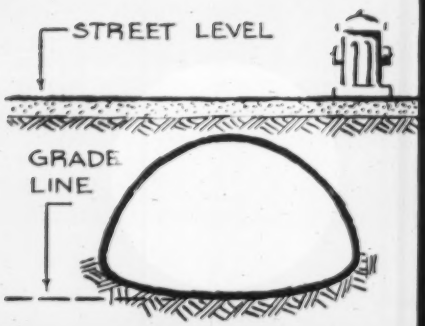
A McGRAW-HILL PUBLICATION

E B POWER
UNIVERSITY MICROFILMS
313 N 1 ST
ANN ARBOR MICH

The street was Too Low for the sewer



Maintaining the grade line meant limited headroom for this new storm sewer in Winchester, Virginia. A full-round pipe with the necessary waterway area would have extended above the street. The solution: Armco Pipe-Arch with low, wide-bottomed design to meet both headroom and waterway area requirements.

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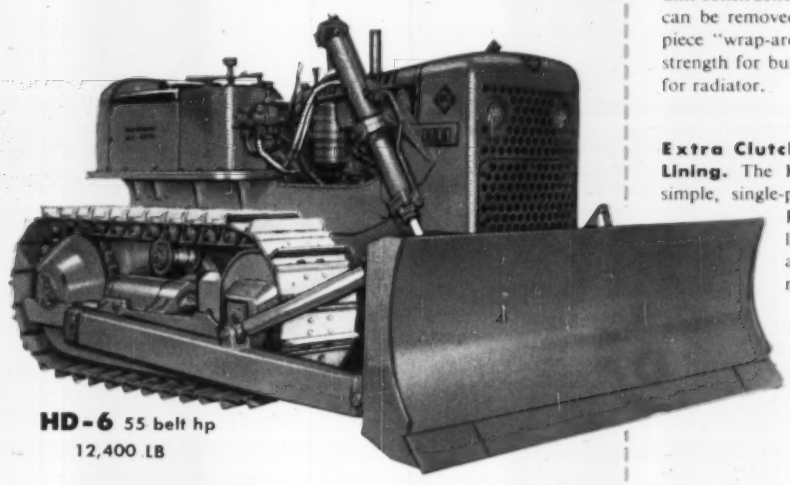
There is a size and type of Armco Pipe to meet every sewer requirement. You get the strength, waterway area, durability and flow capacity you need for each job. Write us for complete data. Armco Drainage & Metal Products, Inc., 4636 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.

ARMCO

This kind of Crawler Tractor Design gives you extra output



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advanced design features that combine big performance, versatility, dependability and simplified servicing!

Look at the Allis-Chalmers HD-6—you can see its functional design . . . how it's built to give sure-footed traction, better working balance. But there's more to this crawler tractor than meets the eye—the performance advantages of Allis-Chalmers advanced basic design. It provides more working power, more strength in all components, more working weight where it's needed . . . makes the HD-6 an outstanding performer with drawn or mounted equipment . . . easier to operate and maintain.

Let your Allis-Chalmers dealer show you how the HD-6 can give you that *extra* output on your jobs.

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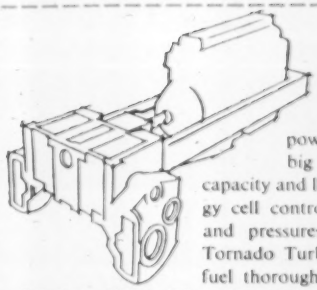

Allis-Chalmers Heavy-Duty Diesel Engine. The HD-6 power plant is designed for big output, ample reserve capacity and low maintenance. Energy cell controls combustion timing and pressures for high efficiency. Tornado Turbulence mixes air and fuel thoroughly for more complete burning. Follow-Through combustion sustains effective working pressures to take advantage of better crankshaft leverage.

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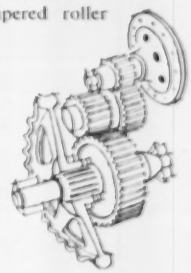

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. . . no other tractor in this size class has them—at no extra cost you get roller bearing truck wheels, idlers and support rollers; 1,000-hour lubrication intervals for truck wheels, idlers and support rollers; 24-volt direct electric starting; crankcase guard; bumper; and lights.

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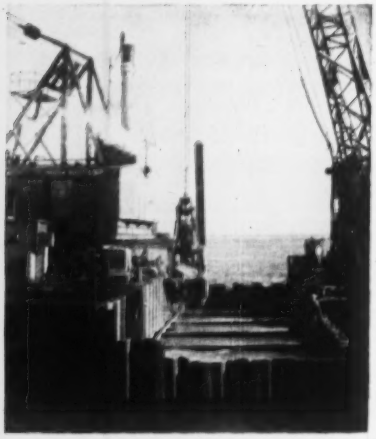

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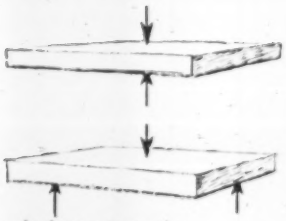

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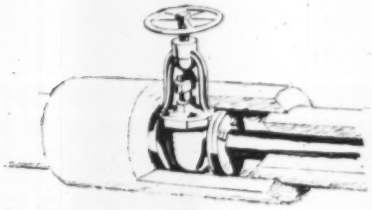

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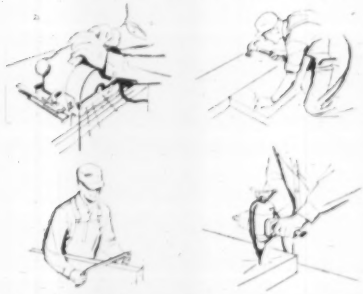

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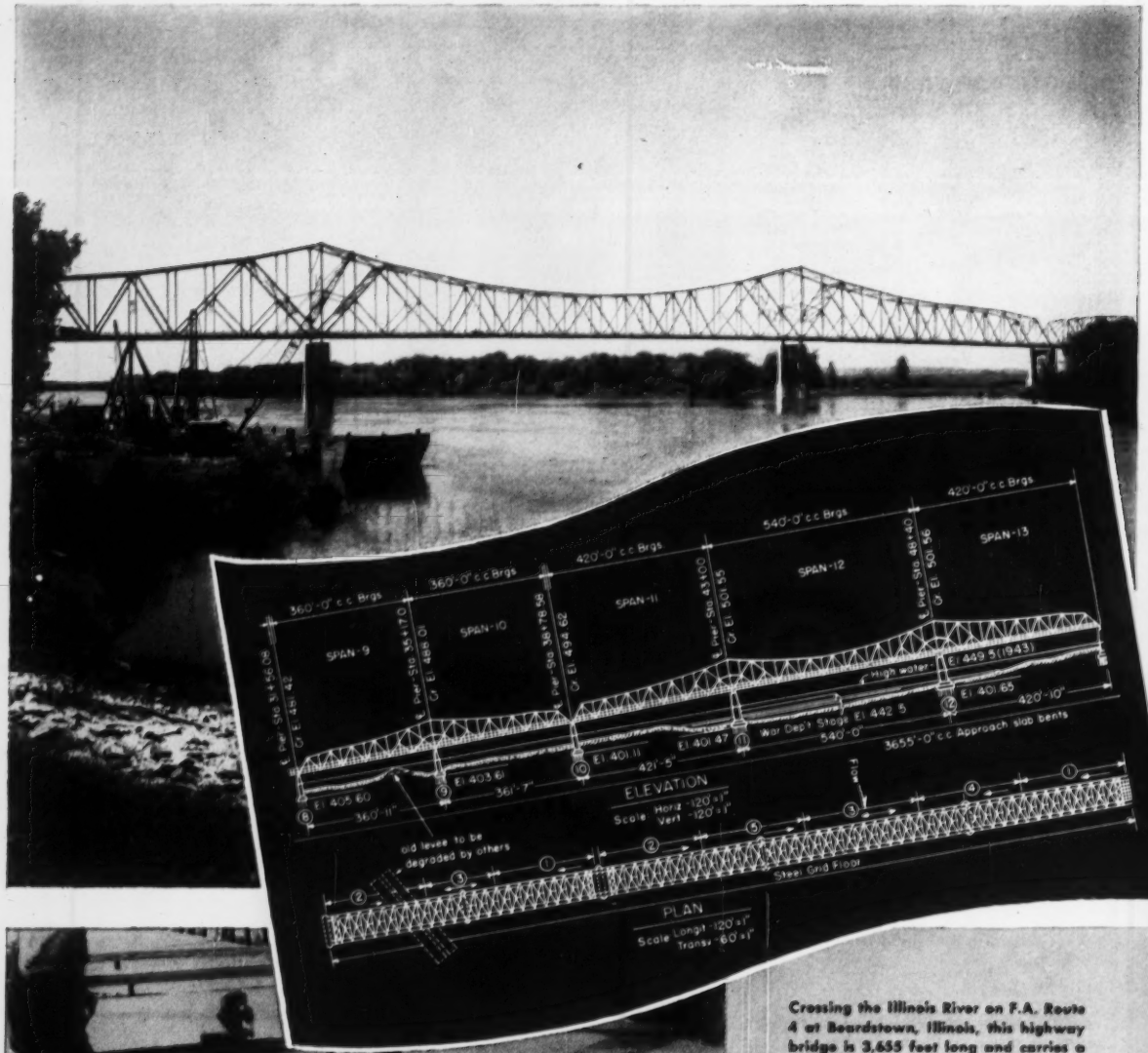


Crossing the Illinois River on F.A. Route 4 at Beardstown, Illinois, this highway bridge is 3,655 feet long and carries a 26 foot roadway.

•

Built by Illinois Division of Highways.

•

Structural steel fabrication by Allied Structural Steel Companies, Chicago, Ill.

•

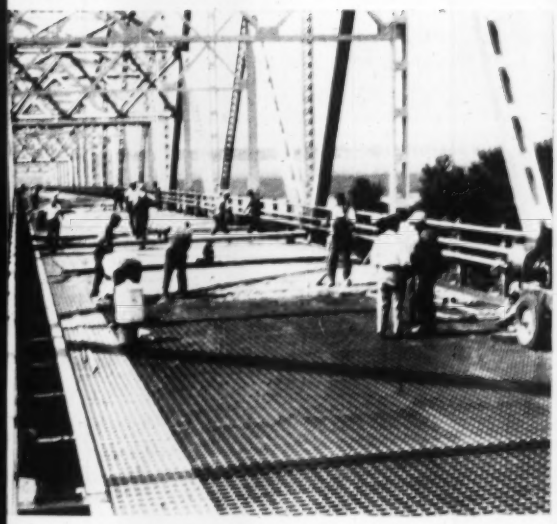
Erection by Industrial Construction Company, Minneapolis, Minn.

•

I-BEAM-LOK Steel Flooring (concrete filled and open) fabricated by United States Steel.

USS I-BEAM-LOK

—reduced flooring deadweight over 50%



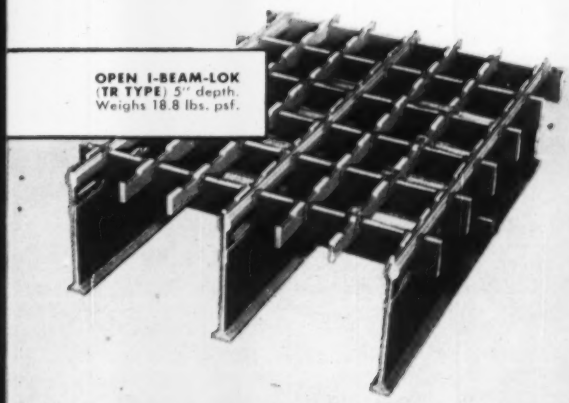
The original design of this highway bridge across the Illinois River at Beardstown, Ill., was based on the use of open-type steel flooring on the 2100′ continuous truss spans. However, after the design was completed—but before work had started, it was decided to change to a concrete filled floor.

If this change had been made with conventional 7″ concrete slabs, the floor dead load on the truss superstructure would have been quadrupled. To accommodate the added weight, the entire superstructure, as well as the foundations, would have had to be completely redesigned.

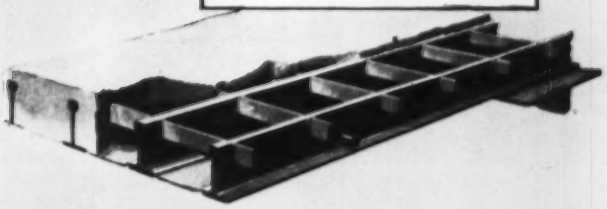
Instead, the engineers solved the difficult problem by the simple and economical expedient of substituting lighter weight, yet stronger structural members (USS Tri-Ten A-242 Steel), *and by using USS concrete filled I-Beam-Lok for the 26′ roadway of the bridge.*

Revised plans called for 44,046 sq. ft. of 3″ concrete-filled I-Beam-Lok (weighing only 47 lbs. psf) and 9,788 sq. ft. of 5″ open-type I-Beam-Lok (weighing only 18.8 psf) for a 2′-4″ gutter on each side.

The result is an extra serviceable bridge roadway floor which weighs only 2,254,000 lbs. as against 4,700,000 lbs. if a conventional solid 7″ concrete floor had been used. Thus, by using USS I-Beam-Lok lightweight steel bridge flooring, the possible dead load of the floor on the Beardstown bridge was reduced *more than* 50%!



OPEN I-BEAM-LOK (TR TYPE) 5″ depth. Weighs 18.8 lbs. psf.



CONCRETE-FILLED I-BEAM-LOK available in 3″ (shown) and 4¼″ depths. Weighs 47 lbs. psf and 61 lbs. psf respectively including weight of concrete. If ¾″ over-fill is used, add 9 lbs. psf to each of the above weights.

AMERICAN BRIDGE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
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USS I-BEAM-LOK

USS

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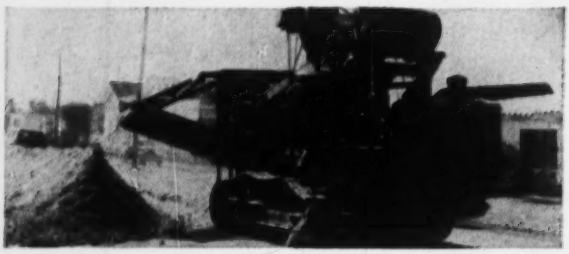
PRODUCTION UP 30%—FUEL COSTS CUT 30%

Arizona Sand & Rock Company replaced a 4-cycle Diesel with a 2-cycle GM Detroit Diesel on this pug mill. Despite clouds of dust, maintenance costs dropped 25%—and production control is better with fast-acting, 2-cycle Detroit Diesel power.

KEEP 600,000-YARD CONTRACT GOING

Marsolino Construction Co. relies on GM Detroit Diesel-powered Ingersoll-Rand Gyro-Flow compressors to keep this 600,000-yard contract moving. They report the Detroit Diesels "start easily—are dependable and economical."



CUTS FUEL COSTS 40%—UPS PRODUCTION 25%

When Miami's R. E. Vaughan, Inc. switched from a 4-cycle Diesel to a 2-cycle GM Detroit Diesel on this ditcher, production jumped 25%—fuel costs dropped 40%. They report the Detroit Diesel delivers more power at less cost, too.

TRAVELS 35 M.P.H. ON THE HIGHWAY

Speed like this *between* jobs means more time on the job for this GM Detroit Diesel-powered Warco grader operated by Michigan's Henry Schmid Sons. Company's Detroit Diesel-powered dragline has worked over 17,000 hours on $100 for repairs.

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And when you specify a GM Detroit Diesel in your construction equipment you get a Diesel that costs less to buy, less to run, and less to maintain.

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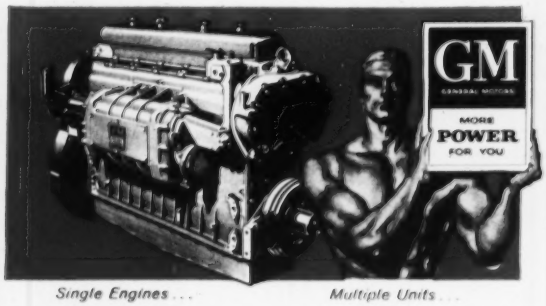
And you get a Diesel backed by a nationwide network of GM Detroit Diesel Distributors ready to give you fast service and quick delivery of low-cost parts *day or night.*

Your local GM Diesel Distributor or dealer can give you the list of equipment powered with GM Detroit Diesel engines. Call him today or write direct.

DETROIT DIESEL

Engine Division of General Motors, Detroit 28, Michigan



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NO REPAIRS IN 10,000 HOURS

In 1951, Minnesota's Phelps-Drake Construction Company bought a GM Detroit Diesel-powered Lima Paymaster. And in 1953, they bought a second Paymaster plus a Wellpoint pump—both GM Detroit Diesel-powered. At last report none of the engines had any repairs, were still going strong after more than 10,000 hours. Phelps-Drake also reports production is high—fuel cost low—with Detroit Diesel power.

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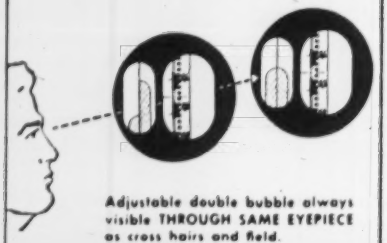

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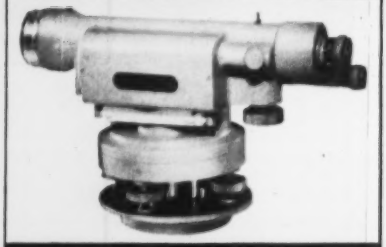

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Reader Comment

What Are Subs Charged?

SIR—I read with interest your article in ENR, Feb. 9, p. 33, describing construction of the Socony-Mobil Building. In particular, I was interested in your description of the material handling methods employed. In connection with this phase of the work, I have several questions I would like to ask.

In the New York Metropolitan Area, on large building projects, what is the practice as regards the following:

(1) Are services of material hoists provided to subcontractors free of charge by the general contractor? If not, are charges for erection and operation of hoists pro-rated to subs or covered by hourly rates for use?

(2) Does the general contractor handle the removal of all wastes, including the subcontractors as well as his own? If so, are the costs of waste removal pro-rated to the subs, and on what basis?

(3) Does the general contractor provide the subcontractors, without cost, water service and electrical services for power and light? If not, how are costs pro-rated?

At the present time I am field superintendent on the construction of a 13-story hospital building, which accounts for the foregoing questions. As a subscriber to ENGINEERING NEWS-RECORD, I follow your construction articles with interest and have picked up valuable hints from them, as well as from the advertisements.

A. R. TURPIN, JR.
Richmond, Va.

[EDITOR'S NOTE—Usually: (1) the general contractor charges an hourly rate for use of hoists; (2) subcontractors remove their own wastes, using waste chutes built by the general without charge, but sometimes the general contractor, in the interest of expediency, cleans up at his own expense; and (3) no charge is made for normal water and electric services, but for heavy service, such as welding, subcontractors provide their own.]

(Reader Comment cont. on p. 9)

Engineering News-Record welcomes expression of opinion from its readers. Comment should be as brief as possible and pertinent to subjects of current construction importance.

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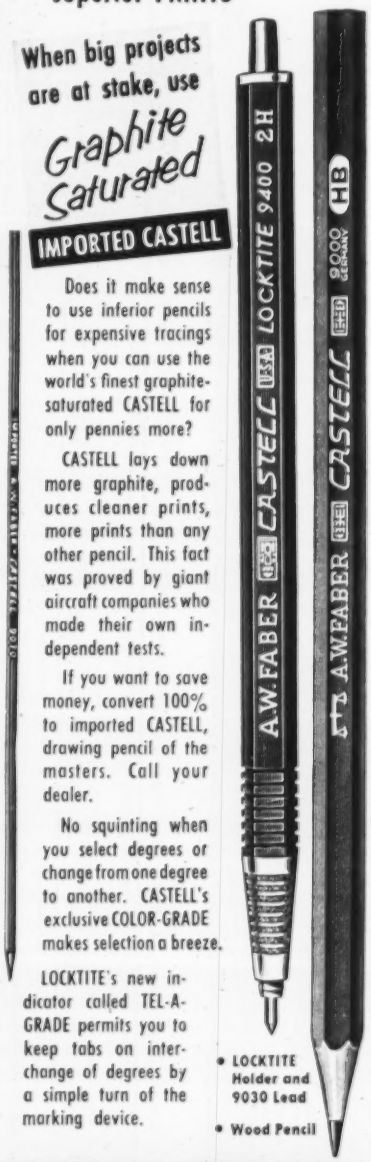


- LOCKTITE Holder and 9030 Lead
- Wood Pencil

A.W. FABER-CASTELL
PENCIL CO., INC. NEWARK 3, N. J.

. . . Reader Comment

Air Curtain Is Old Hat

Sir—In re your article concerning the use of an air curtain as a store entrance (ENR Dec. 1, '55, p. 24): Such installations, although of a smaller design, were used for entrances to stores in Dodge City, Kan. in 1940.

Also, we are told that during the war, the Navy Department used high pressure nozzles to maintain an air curtain across the quenching tanks used in the manufacture of long-range rifles. They were very effective—to the point that heat had to be provided in the crane operator's cab.

William F. Ryan
Ryan Engineering Co.
Consulting Engineers
Salina, Kan.

How to Control Floods

Sir—The letter from Frank D. Stemer (ENR Feb. 16, p. 10) relative to the part that conservation can play in flood control programs revives the old controversy between engineers engaged in planning flood control structures and the advocates of flood control through more active conservation programs. Both the engineers and conservationists are right in claiming benefits from their works but both are reluctant to acknowledge the limitations of their arts. To be more specific, flood control by reservoirs can never be completely effective unless:

(a) The entire damage area above the centers of drainage is controlled to the point where flows are limited to safe channel capacities, and

(b) Reservoir storage capacities are adequate to store or effectively regulate the maximum probable flood.

The first requirement is difficult to meet because most river basins lack reservoir sites for complete drainage area control. If satisfactory topographic and geologic conditions exist at all required reservoir sites, the cost of utilizing the sites is usually prohibitive because of existing developments. In other words the costs of condemnation are greater than the benefits for flood control.

The ability to obtain reservoir capacities sufficient to control the maximum probable flood is usually limited by the topographic features of valleys and again by possible damage to existing developments. It would have been a happy circumstance if the early settlers could have had the vision and courage to reserve reservoir sites for the use of posterity!

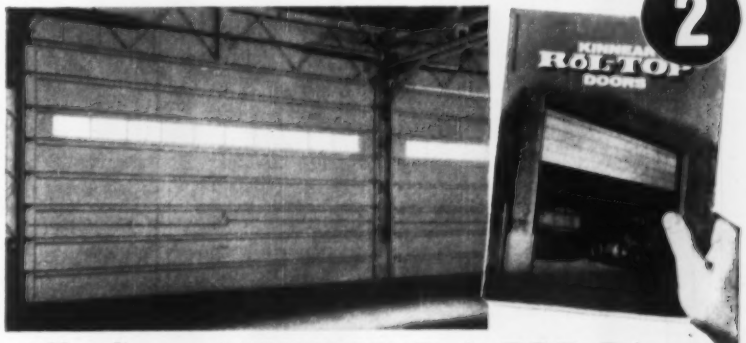
(Continued on page 10)

Two New Catalogs Answer Your Needs For Door Efficiency

Here's your up-to-the-minute information on doors that cut operating costs, look better *last longer.*

KINNEAR Steel Rolling Doors

— with the coiling upward action of interlocking steel slats *(originated by Kinnear)* — are illustrated and described here in every detail. Also complete data on Kinnear Steel Rolling Fire Doors *(labeled by Underwriters' Laboratories, Inc.)* and the upward-acting Kinnear Steel Rolling Grilles, the attractive steel-bar-and-link protection that admits light, air and vision. Full details on Kinnear Motor Operators, too!



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33-foot screed saves $500
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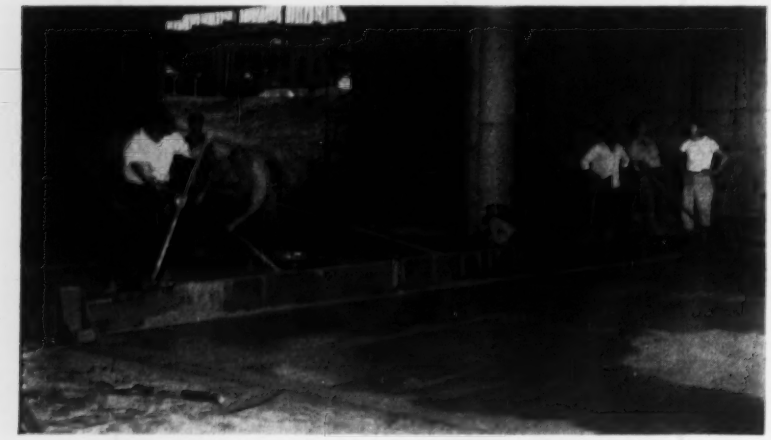
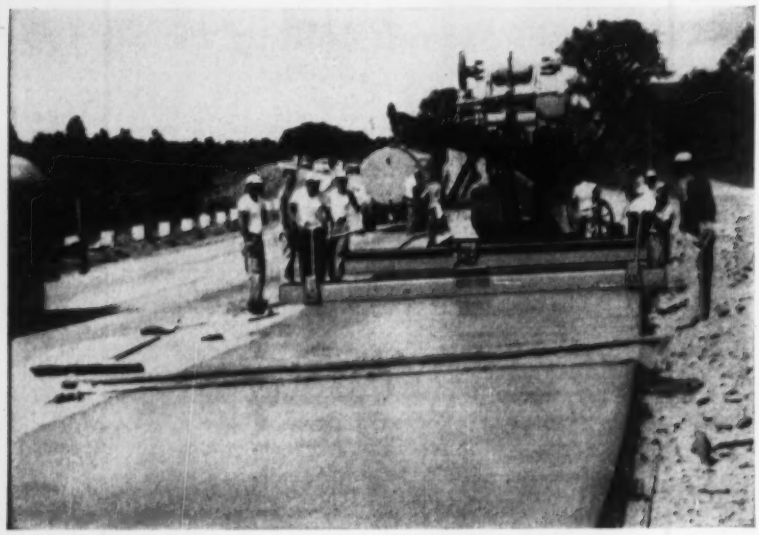


Here's the story: The contractor on this warehouse job purchased the 33′ STOW Screed to strike off a warehouse floor of 1″ slump concrete. By using the 33′ screed instead of the 12′ screed he had been using, the contractor estimated that he saved $500.00 on the 50,000 square feet poured. With a 1″ slump concrete, the slab set up so fast that they were able to put a trowel on the job only 1 hour after screeding.



Screeding a Third Lane on a Hill This job was too small for the contractor to put his big finishing machine on the job, so he used a 14′ STOW Vibrating Screed. This screed can be bought as a packaged unit to be mounted on your own beam. For more information on screeds, write for STOW Catalog 560.

STOW MANUFACTURING CO.

19 Shear St., Binghamton, N. Y.

. . . Reader Comment

Does the above discussion mean that the conservationist can now rush in and save the day? The answer is definitely no. Soil conservation, contour plowing, terracing and reforestation are absolutely essential for the preservation of our lands, but their effectiveness in the control of *major floods* is very limited. Proper land treatment can increase the infiltration capacity of the soil. Dry soil may absorb water at the rate of one of more inches per hour for a few minutes, but this rate decreases rapidly to an essentially constant rate of perhaps 0.2 to 0.5 inch per hour. If rainfall rates of 1 to 3 inches per hour or more continue irregularly for many hours or even for several days, it is obvious that an enormous volume of "rainfall excess" will be created. This water will find its way to the stream channels and eventually create floods that can only be controlled by engineering structures.

We know from Indian legends and even geological evidence that great floods occurred when the country was still in a primeval stage.

Without question proper conservation practices will reduce the frequency of minor floods caused by rainfall rates that are more nearly equal to the infiltration capacities of soils. Conservation also reduces soil erosion and the sedimentation of channels and reservoirs and is completely justified for that reason alone.

Mr. Steiner believes that the effects of man-made impervious area are becoming serious. The increase in impervious areas resulting from urban developments, airports, and highways is only critical in the immediate vicinity of such developments. The percentage of impervious area in most of our river basins of more than 100 square miles is negligible.

Effective flood control by conservation practices has been accepted, without reservation by many normally thinking people. In fact it is a concept that has fired the imagination of a multitude of sincere disciples who unfortunately have never inquired into the physical and quantitative aspects of the rainfall-runoff relationship. Overzealous advocates of conservation have made such exaggerated claims for their programs over the years that they have unwittingly delayed the authorization of necessary engineering works for the control of floods.

GORDON R. WILLIAMS,
Associate Professor of Hydraulic Engineering Massachusetts Institute of Technology

(*Reader Comment cont. on p. 12*)

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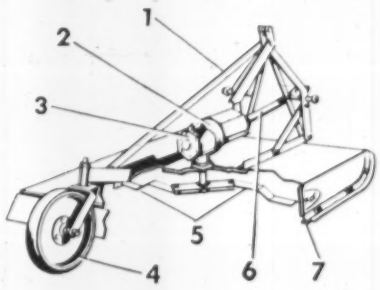

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. . . Reader Comment

Credit Omitted

SIR—The issue of your excellent publication for Mar. 15 contains on p. 121 an article dealing with the Robinson Bay Lock unit prices opening entitled, "Lock Includes Highway Tunnel."

No mention is made of the St. Lawrence Seaway Development Corporation, which is the agency responsible for the construction, operation and maintenance of the U. S. portion of the Seaway. The Corps of Engineers, U. S. Army, is the design and construction agent for the Corporation, and is very properly mentioned in your lock article.

However, I am sure that you will agree that your readers will be more accurately informed by mention of the role of the Seaway Corporation.

EDWARD R. PLACE
Director of Information
St. Lawrence Seaway
Development Corp.

CALENDAR

Western Association State Highway Officials Conference, Phoenix, Ariz., April 10, 11, 12, 13.

Construction Specifications Institute, ninth annual meeting, Architectural League, New York, N. Y., April 19.

American Water Works Association, Diamond Jubilee Conference, Kiel Auditorium, St. Louis, Mo., May 6-11.

Society of American Military Engineers, 36th annual meeting, Washington, D. C., May 14-15.

Purdue Industrial Waste Conference, Purdue Memorial Union, Lafayette, Ind., May 15-17.

American Institute of Architects, annual convention, Biltmore Hotel, Los Angeles, Calif., May 15-18.

Prestressed Concrete Institute, second annual convention, Hollywood Beach Hotel, Hollywood, Fla., May 16-18.

Society for Experimental Stress Analysis, spring meeting, William Penn Hotel, Pittsburgh, Pa., May 16-18.

Building Research Institute, annual meeting, Sheraton-Brock Hotel, Niagara Falls, Ont., May 21-22.

National Society of Professional Engineers, Ambassador Hotel, Atlantic City, N. J., May 23-26.

Concrete Reinforcing Steel Institute, annual meeting, The Greenbrier, White Sulphur Springs, W. Va., May 28-June 2.

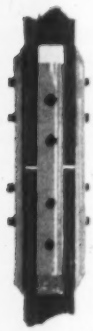
American Society of Civil Engineers, Spring convention, University of Tennessee, Knoxville, Tenn., June 4-8.

Materials Handling Exposition, Cleveland, Ohio, June 5-8.

World Conference on Earthquake Engineering, University of California, Berkeley, June 12-16.

American Society of Landscape Architects, 57th annual meeting, Cleveland Hotel, Cleveland, Ohio, June 24-27.

"Trees jest don't grow long enough for this here job," grumbled Paul Bunyan to Babe, the Blue Ox. He was driving piles for his bridge across Lake Michigan. "Now if I could git me one o' them machines ✻the Baxter folks developed, Babe, I could splice me up a piling 900 feet long and get to the bottom o' this pesky pond."



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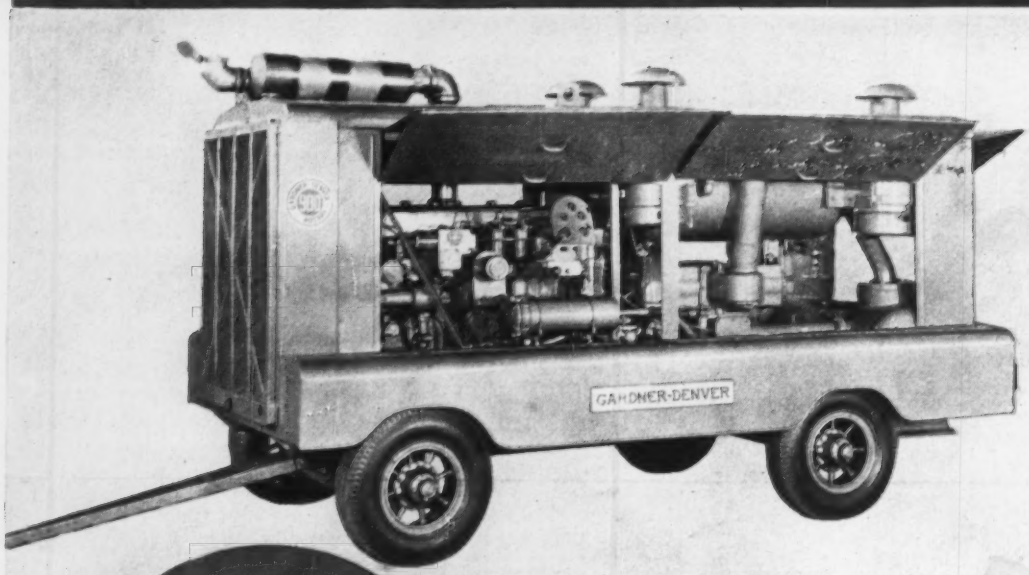

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Gives you—Extra air capacity for bigger drills or more of 'em—without additional engines and equipment to care for. For heavy rock cuts, for quarries, for open pit mines—wherever compressed air in volume can help speed the work.

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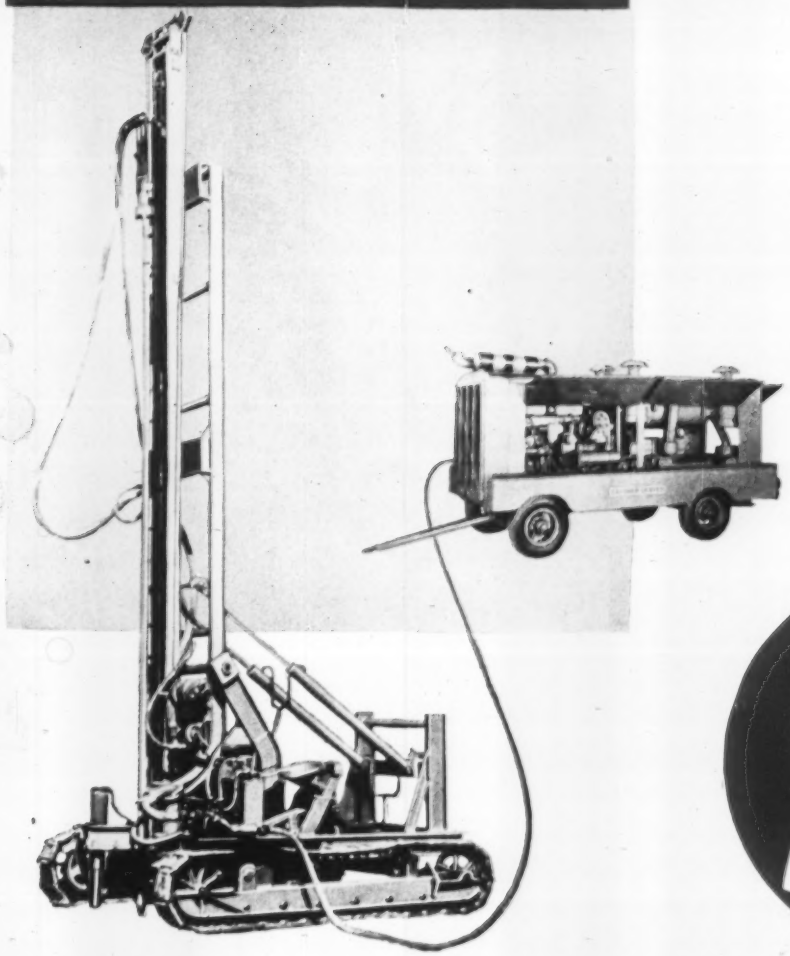

DH143 SPECIFICATIONS:

Hammer Diameter	5½"
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Approximate Weight, complete crawler-mounted drill	10,500 lb.
Rod Change, up to	20'
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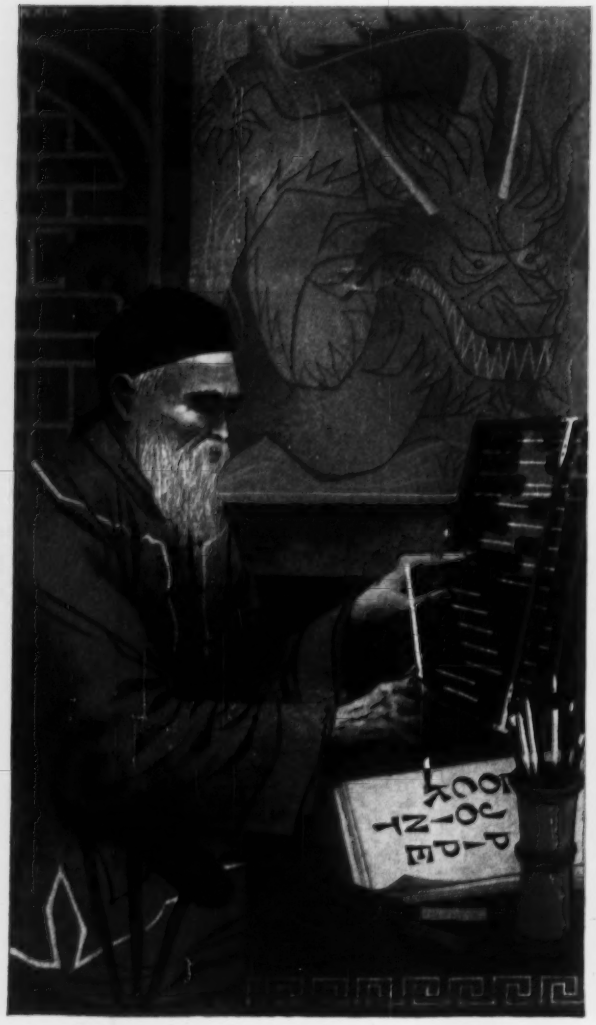

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THE CONSTRUCTION WEEK

PINWHEEL RUNWAY LAYOUT—Last week, after years of painstaking study, the Navy decided to go ahead with $8 million worth of planning and land acquisition for a master jet training airfield in Meridian, Miss., that will be laid out in pinwheel fashion. There will be two pairs of parallel runways, each runway taking off from a corner of a square whose sides are to be 5,000 ft long. The central square will contain operations and control tower facilities, maintenance hangars and parking apron. Support facilities will be located in the quadrants formed by the runways. Construction, estimated to cost $18 million, is scheduled for a September 1957 start.

LIFT-SLAB MISHAP—Cleveland Building Commissioner William D. Guion has ordered dismantlement of a pigeon-hole parking garage erected by the lift slab method to a record height of eight stories. The top of the structure shifted 11 ft after the eight slabs had been jacked into place but before the column connections were welded. After bracing the structure to prevent further buckling, Central Lift Slab Co. apparently is faced with the unprecedented task of lowering the slabs along the tilted columns.

PRIVATE MASS HOUSING UP—A spurt in private mass housing contract awards this week added a whopping $211 million to the 1956 cumulative total. The 14-week volume of housing awards tops $1.9 billion, nosing out last year's record high by 0.3%. (For further details see page 112.)

ALL SET FOR A WATER CZAR—California's Legislature last week set up the Water Resources Department that will coordinate and direct efforts of all state agencies with an interest in water problems. When the governor threatened to veto any bill that did not vest policy-making in a single director, lawmakers complied, with a compromise. They authorized a state water board with advisory powers only. The governor will get to appoint a director to watch over all California water interests—including the $1.5 billion Feather River plan, for which oil revenues have been made available (ENR April 5, p. 19).

PEAT BOG WINS AGAIN—A 70-ft deep peat bog underlying a 300-ft section of Ohio's new turnpike 18 miles from the Indiana border has caused trouble again. This time one lane of the roadway has sagged eight inches. During roadbuilding operations the bog was partially removed and filled. Then, the roadway sagged just before the 'pike opened for business in October, and the pavement was jacked back into place with a grout of agricultural limestone and cement. Now consulting engineers are considering new corrective measures, including possibility of driving piles to solid ground or making the fill of solid material wider.

New! The Sherman Major Power Digger

with Many Advanced Features to Increase Versatility and Earning Power

The all new Sherman Major Power Digger has been engineered to take full advantage of the ruggedness and economy of the Fordson Major Diesel Tractor. This heavy-duty unit will dig 12 feet below grade, reach 18 feet 3 inches behind the tractor rear axle, dig throughout a swing arc of 180 and will carry a full bucket to a height of 8 feet 8 inches for loading trucks.

Additional features of the new Sherman Major Power Digger include twin crowd cylinders, heavy steel plate construction, large diameter hinge pins, heavy steel castings, replaceable hardened steel bearings at hinge points, and a newly designed dipstick, boom, cylinders, bucket and sub-frame assembly.

Write for bulletin No. 1441.

See the Sherman Major Power Digger soon at your local **FORD TRACTOR DEALER**

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ROYAL OAK, MICHIGAN
POWER DIGGERS* • FRONT END LOADERS • FORK LIFTS

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WASHINGTON OBSERVER

A long-range highway program—the multi-billion program—is now doubtful. Complete failure cannot now be predicted. But this can be said: The conflicting opinions on many issues on highways that Congress has before it indicate that, for the second year, a grand plan for highway construction is in trouble.

Higher user taxes are frowned upon by the Senate Finance Committee. The chairman, Harry F. Byrd, is against higher levies on taxpayers now, and besides, does not like the idea of legislation that freezes higher rates on gasoline, tires, and so on, for many years to come.

Prevailing wages by federal government fiat are opposed, too. Yet the legislation—as now written—that is coming before the House of Representatives will require invoking the Davis-Bacon Act on federal-aid highway programs.

Toll road credits have kicked up a storm. Congressmen from eastern states demand that toll roads in their districts be given a federal financial credit, and threaten to oppose long-term programs unless they get their way. The legislation before the House Public Works Committee does not do so.

Industry groups are becoming pessimistic—they are more downcast than is the Administration. They cite the reasons given above, as well as the fact that time is running out; and the fact, that in an election year, the Democrats and Republicans may jockey so much on highways, that nothing will happen.

The Administration can make a recovery. Supporters of long-term highway construction are pleading that the President give strong support to the Fallon Bill—with the taxes prescribed by the Boggs Bill. They feel such White House support is crucial, and lacking that, the prospect is for a simple continuation of the present federal-aid program, with perhaps the federal contribution going up to $1-billion-plus beginning July 1957.

•

School construction legislation is in much the same boat. But there is this new estimate, from pro-school people, that puts a new light on the situation: The National Education Association has hopes that the non-discrimination amendment of Rep. Adam Clayton Powell can be defeated in the House. If so, new life will be blown into the federal-aid program. Without the no-discrimination amendment, southern senators would be in a position to vote for the program, once the House has acted. The outlook, though, is still dim.

•

The Administration's additional military spending request will mean more construction. The stepped-up program for heavy B-52 bombers has in it money for additional base construction, maybe $130 million worth. And that construction would be, primarily, in the United States.

•

Floyd S. Bryant, a California oilman, takes over as chief of Defense Dept. Installations. He will be the boss of new military construction, housing, and so on. Bryant takes over from Franklin G. Floete, the new General Services Administration chief.

•

How to handle atomic contamination from a runaway reactor again shows up as a serious problem in the search for peaceful uses for the atom. An Atomic Energy Commission experimental reactor got out of hand at Arco, Ida., last fall. And even though it was only about the size of a football, radioactivity resulting from the accident reached the test building.

BORDEN

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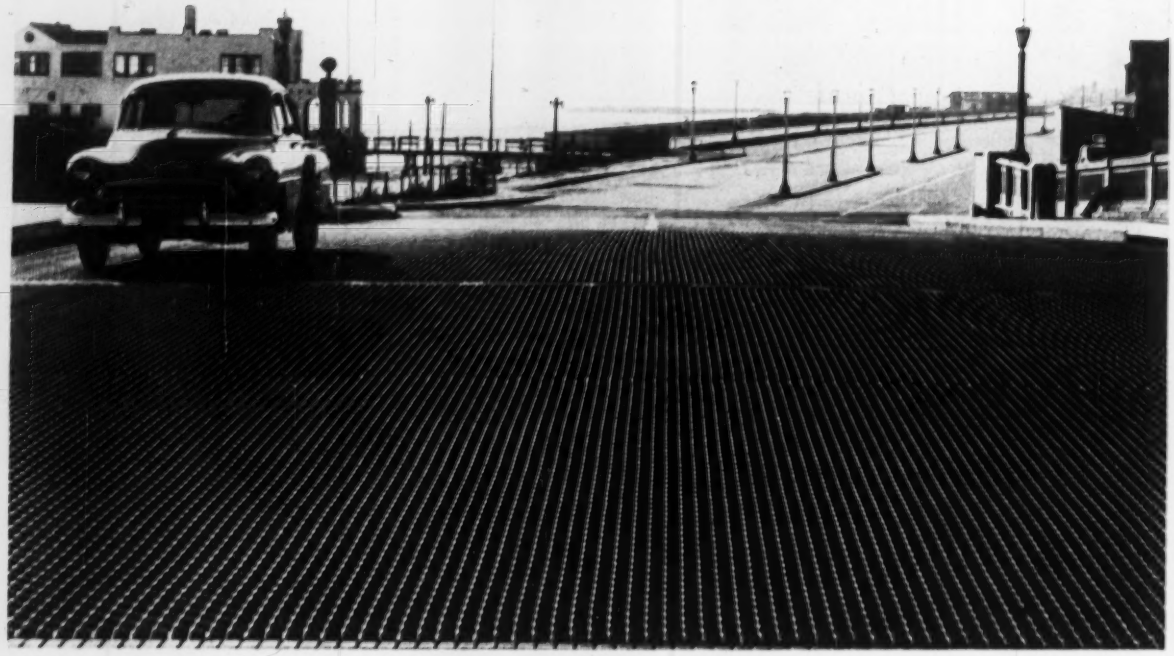

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SUPPLY — Orders are climbing faster than shipments.

DEMAND — It will remain strong even if there's a drop in homebuilding.

PRICES — They'll go higher, probably reaching a peak in late summer.

What's the Outlook for Fir and Pine?

Contractors can depend on a generally good supply of southern pine and Douglas fir lumber this year, despite a boom demand and some regional production and shipping problems, an ENR survey showed this week.

Deliveries may be slow or erratic in some areas in late summer and fall, however, because of the steadily-worsening shortage of freight cars. This will affect Douglas fir shipments primarily.

Prices, which have moved higher in recent months, probably will continue to rise because of higher freight rates (which took effect March 7), reduced production in the Pacific Northwest due to bad weather and substantially higher labor costs in the South caused by the increase in the federal minimum wage law.

How much prices will go up this year probably depends to a large extent on how close shipments match orders. Lumber prices are governed by the law of supply and demand much more directly than steel, for example.

One factor that may help to keep prices in line is the keen competition between southern pine and Douglas fir. Although on a national average, Douglas fir prices are higher than southern pine (roughly $122.60 per Mftbm as against $104.10 for southern pine), it is generally conceded that fir has a quality edge and hence commands a premium.

Douglas fir accounted for 52% of the total fir and pine shipments last year, with a reported 9,298 million board feet shipped, as against shipments of 8,711 million board feet for southern pine.

Southern Pine

Off to a good start in the first two months of the year, southern pine producers are confident they can meet the demands of a record construction season. In the first two months of '56, production of southern pine lumber was 7.2% higher than in the same two months of '55 and 11.6% higher than for January and February 1954.

And, at the 41st annual convention of the Southern Pine Association held in New Orleans last week, the southern pine producers heard some reports that encourage long-term optimism for the area as a lumber producer.

Members of the association were told that a preliminary U. S. Forest Service report shows that southern pine "so dominates the nation's sawtimber-growth picture that it exceeds the growth of all other softwood species, eastern and western combined."

But producers of southern pine also report some problems.

Southern producers point out that while consumption of southern pine fell 8% between 1947 and 1954, Douglas fir consumption rose 21% in the same period.

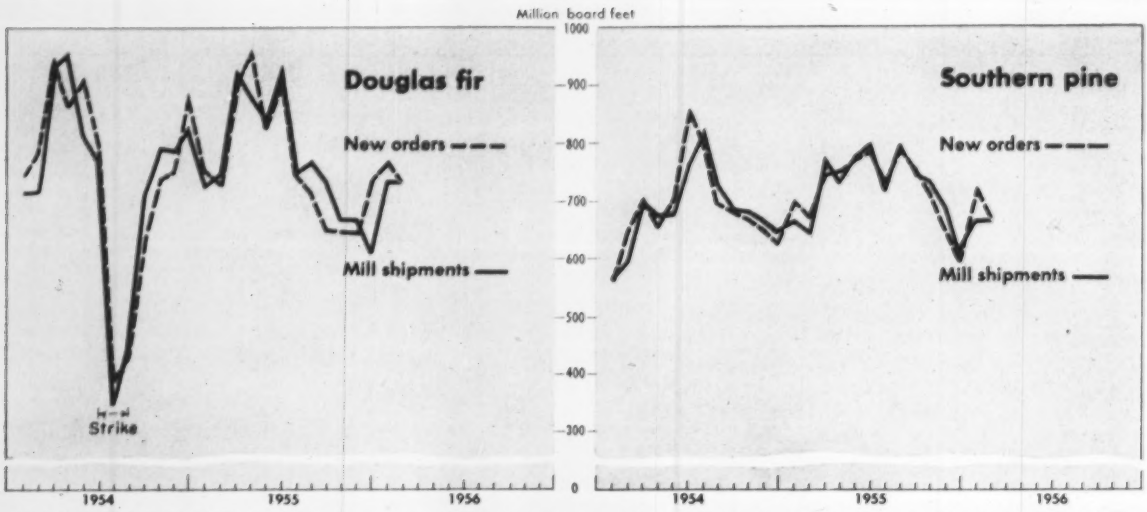
And, they are concerned over increasing shipments of Douglas fir into the very states that produce southern pine. These shipments are growing even though freight costs often are equal to as much as 50% of the F.O.B. mill price.

One reason that Douglas fir can compete in the southern pine regions is that it requires only one-third to one-half as many man-hours to log and manufacture Douglas fir as southern pine. Western producers benefit from a larger output per log because the trees are larger.

With this in mind, it is easy to see why the increase in the federal minimum wage law has so much impact on the South.

More than four-fifths of the workers in the southern sawmills in 1955 earned less than one dollar per hour. In Georgia, more than 85% of these workers were paid less last year than the new minimum rate.

This gains added significance when you consider that small operators—producing less than 3,000,000 board



AFTER RUNNING AHEAD of shipments in January and February, orders nearly matched shipments in March.

. . . This year's lumber outlook

feet annually—are the principal lumber producers in the South. It is estimated that they account for as much as two-thirds of the total lumber production.

Trade rumors persist in southern labor areas that many of these small mills will shut down rather than pay $1 an hour for labor. The feeling is that they cannot make a profit at that rate because competition prevents them from raising prices enough to compensate for the added production cost.

There's another important point. These small operators have comparatively little invested in their mills. Equipment for sawing 5,000 board feet daily costs less than $10,000. And, the operation requires only about eight men (excluding loggers). Because of this, the southern pine industry always has been noted for the high rate of turnover in number of mills.

This could affect production—if the shutdown of small mills was widespread. But most observers feel it is still too early to determine the full effect of the $1 an hour minimum wage.

How do large producers fare? One major producer told ENR that along with other mills his firm increased prices $3 per thousand board feet, then added, "A $3 increase is just about as much as the market will stand for." Customers have told this producer that if the price of southern pine goes up another dollar, they will switch to West Coast lumber.

"West Coast competition sets the market—particularly from Tennessee northward," is how this southern pine producer sums up the price situation.

If Douglas fir production should lag because of the weather headaches in the Pacific Northwest, it might make it possible for producers of southern pine to raise their prices—but this would be only temporary.

Douglas Fir

West Coast producers also are having their troubles. Throughout northern California and the Pacific Northwest, mills complain of a shortage of logs. This is blamed on the bad weather.

In northern California, floods washed out many roads so that logs could not be shipped to the mills. And, rainy weather and soft ground hampered the operations of independent loggers from whom many mills buy their logs.

Producers in the northern California area don't feel that demand has increased over last year. And, they say prices went up only because floods decreased supply. One producer estimated that 50% of the lumber production in northern California was affected by floods.

Mills in this area can meet demand for most construction lumber, but yards have difficulty placing orders for structural timbers. One reason for the shortage of timbers, according to the mills, is that logs suitable for timbers are snapped up by plywood producers.

In the Douglas fir regions of western Washington and Oregon, snows, heavy rains, winter slides and bridge washouts on timber access roads into federal forest make prospects seem dim for an early pickup in lumber supply.

The log supply at sawmills is far below normal. Some small mills that are dependent on scattered tracts are operating on short work weeks. Pine loggers east of the Cascade Mountains are working in snow up to nine feet deep to meet demand for logs. Crews are falling and bucking logs the same day so that trees will not get lost under overnight snows.

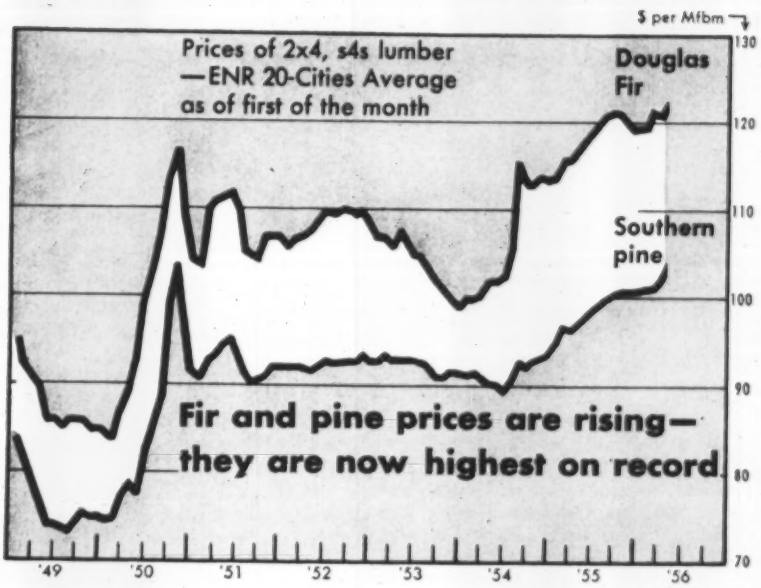
Lumber producers in the Seattle region, faced with similar problems, say they can meet the demands of a record construction season—if they can get logs. That, they point out, depends on the weather.

Freight-Car Problem

Supply of logs is only part of the problem of getting enough Douglas fir to market. Equally serious is the matter of transportation. Freight cars to haul lumber still are in short supply. That shortage is expected to get worse in the months ahead.

The Interstate Commerce Commission estimates that the freight-car shortage is now running about 5,000 cars a day for all types. No breakdown is made on shortages of freight cars for the lumber industry because the practice is to ship in any type of car available, except for some of the finished lumber.

The real pinch will be felt by Douglas fir shippers starting next month. Wheat and other grain is generally taken out of inland storage and shipped to the ports starting in May, to make storage space available for current crops. Such shipments extend over a two or three month period. Then other farm products come into the picture so that the freight-car shortage builds up to a peak in the fall.



The railroads are building more freight cars in an attempt to overcome the national shortage. One railroad alone—the Southern Pacific—will turn out 3,500 freight cars this year, which will be 1,100 more than it built last year. But the full effects of the freight-car program won't be felt until next year.

Meanwhile, the Interstate Commerce Commission—in an attempt at more immediate results—has issued one of the most controversial agency orders in years.

Under the new ruling, known as ICC Order 910, any shipper who fails to make use of the most direct and fastest available railroad route for freight is subject to fines ranging from $100 to $500 a day for each offense. This hits hard at many Douglas fir shippers in the Pacific Northwest.

As one of its goals, the order was intended to stop the practice of mills starting unsold shipments of lumber eastward from the Pacific Northwest while brokers carried on negotiations for sale of the carload.

By starting the shipments out on "slow tracks", and then switching the shipment to a fast track when the carload was sold, the shippers, in effect, used the freight cars as rolling warehouses.

Some of the shippers have protested to the ICC that if the practice is stopped, many small mills will be required to carry lumber inventories that would be beyond their financial capacity.

Others say that enforcement of Order 910 will mean that lumber men will ship by circuitous routes to achieve delays needed by some 800 green dimension mills that load directly into cars and sell the shipments while they are in transit.

However, some in the industry feel that the ICC order will speed up the turn-around time of freight cars and make more shipments possible. It may turn out to be a significant factor in lumber shipments this year, and, at least indirectly, it could affect the price of lumber—if it succeeds.

Concrete Talks to Begin In Five California Cities

The University of California will sponsor five one-evening meetings on practical concrete problems between April 13 and May 1 in five California cities.

Prof. Joe W. Kelly, of the university's Civil Engineering Department, will be moderator for a panel of experts. The school arranged similar meetings in 1954 and 1955.

Three industry groups helping the school's Institute of Transportation and Traffic Engineering, and University Extension with the meetings are the West Coast Committee of the American Concrete Institute, the Portland Cement Association Information Bureau, and the Concrete Industry of the Pacific Coast.

Times and places are: April 13, San Francisco, U. of Calif., 540 Powell St.; April 23, Sacramento, Governor's Hall, State Fair Grounds; April 27, Fresno, Pacific Gas & Electric Co. Auditorium; April 30, San Diego, Council Chamber, Civic Center; and May 1, Pasadena, Gold Room, (Civic Center Auditorium).

For more information, contact Dept. of Conferences and Special Activities, U. of Calif. Ext., 2441 Bancroft Way, Berkeley 4, Calif.

School Report

White House conference committee favors U. S. aid

Though various surveys have come up with conflicting figures, the nation can be assured that its classroom shortage is extremely critical.

This is, in summary, the report handed President Eisenhower by a special committee that has been examining the school problem for the last 18 months.

Known as the Committee for the White House Conference on Education, the 37-member group's final report was submitted by Neil H. McElroy, president of Procter & Gamble Co. The committee, which was authorized and financed by Congress at the President's request, last year mobilized the greatest grass-roots inquiry of the country's public school needs ever attempted. Studies by local groups throughout the country culminated in the White House conference of last Nov. 28, at which 2,000 educators and laymen participated (ENR Dec. 8, 1955, p. 21).

The bulk of the committee's 195-page report represents a summation of what appeared to be the majority opinion of the conference.

Key policy statement in the report could be found in this passage: "This committee believes that federal aid for school construction should be made available on a limited basis to all states and territories and the District of Columbia to help overcome the present school building emergency.

It believes, also, that federal funds should be provided under the philosophy of encouraging greater use of state and local funds . . . that federal aid to all the states can be justified, however, only on a temporary basis to meet an emergency situation such as the present school building emergency."

This is consistent with the line already taken by the Administration in asking Congress for a five-year, $1.25 billion aid program. Democratic legislation proposes a four-year, $1.6-billion program.

The White House committee's report does not specify a sum it considers justifiable for federal aid, nor does it indicate what time limit it would consider "temporary." Indeed, it does not appear to be the type of document that will aid materially in the uphill fight to get favorable action on a school construction bill at this session of Congress.

The segregation issue actually has been the principal stumbling block to action on school legislation.

Steel savings are in view as . . .

Tests Verify Plastic Design

A new design theory that will make steel construction more economical has been developed to a stage where it shortly can be put into widespread practical use.

More than 300 engineers attending the Eighth National Engineering Conference of the American Institute of Steel Construction at Lehigh University, Bethlehem, Pa., were told that tests had verified the accuracy of plastic design theory for continuous beams and frames and that design recommendations may be available within one year.

The method is particularly advantageous for continuous frames and beams. It takes into account the ductility of steel, which enables flexural members to continue to carry loads after stress in the outer fibers reaches the yield point. In contrast, the elastic theory commonly used sets as a limit reaching of the yield point any place in a beam. In both methods, a safety factor is applied to limit loads to safe values.

• To use strength now wasted—Also known as limit-load or ultimate-strength design, plastic design utilizes currently neglected strength in two ways:

• The whole cross section of a beam at a point of maximum moment is assumed to be stressed to the yield point. Thus, after the elastic range is exceeded a rectangular cross section develops 50% more bending moment before strain hardening begins and a solid circle 70% more, whereas an average wide-flange section develops only 14% more. The recent revision of the American Concrete Institute's building code requirements for reinforced concrete, incorporating formulas for ultimate-strength design, included only this application (ENR March 1, p. 26).

• In continuous beams, plastic hinges develop at points of maximum bending moment, resulting in a redistribution of moment. A fixed-end beam, for example, will not fail until after the ends yield enough to cause a third plastic hinge to develop elsewhere on the span. (According to this theory, a continuous beam or frame will support the same ultimate loads even though some supports may be slightly displaced.

Under working loads, however, flexural members would be stressed only in the elastic range, just as if they had been designed by the elastic theory. Deflections of continuous beams usually would be less than for conventional, simply supported beams.

Staging the conference at Lehigh University was not only convenient for demonstration purposes, but also appropriate. Much of the data presented was a result of a ten-year research program carried out at Lehigh.

• Advantages of plastic design—The significance of the new theory was aptly brought out in introductory remarks by Earle V. Grover, President, AISC:

"To the owner, the designer, the fabricator and the occupant, there will be substantial difference and benefits. In some cases, the difference may be lower cost, in others an increase in unencumbered, usable space, in still others a saving of time in design, fabrication or both, and often a combination of these benefits."

Bruce G. Johnston, professor of structural engineering, University of Michigan, said that plastic design is not a revolutionary concept supplanting all other design procedures. Current design practice will continue to have a place, but when it fails to lead to a consistent relationship between strength and working load it proves inadequate. The proper way to design a continuous frame under conditions that do not lead to failure by fatigue, buckling or brittle fracture is by the plastic method.

Prof. Johnston called attention to the fact that when elastic theory is used for the design of continuous frames, the working load for one may be half the actual capacity; whereas, for another of the same type, the working load might be only one-quarter the capacity of the frame. Because of such inconsistencies, working stresses have been juggled to permit continued use of elastic-stress formulas.

The professor also pointed to another advantage of plastic design: "Surprisingly," he said, "determination of maximum strength by plastic analysis is usually simpler than elastic analysis for maximum bending moment."

• Assumptions—Basic concepts and design procedures were presented in detail by Bruno Thurlimann and Robert L. Ketter, of Lehigh, and Edward R. Estes, Jr., research engineer, AISC. They said the theory is based on the assumption of a straight-line moment-curvature relationship up to the elastic limit, after which moment remains constant with increasing deformation. Also, plane sections are assumed to remain plane, and deformations are small, so that equilibrium conditions can be formulated for the undeformed structure, as in elastic analysis.

• Two methods of analysis—Two methods of plastic analysis were given—based on "upper bound" and "lower bound" theorems.

The upper bound theorem states that a load computed on the basis of an assumed mechanism will always be greater than or at best equal to the ultimate load. To use this theorem, plastic hinges are assumed at sufficient points of maximum moment to convert the structure into a link mechanism. The loads corresponding to each possible type of link mechanism can be computed by the method of virtual displacement. The smallest load is the one under which the structure will fail. If an equilibrium check indicates that nowhere in the structure is the plastic moment (bending moment forming plastic hinges) exceeded, then the solution is the correct one. Ketter and Estes used charts developed by the former that considerably simplify plastic design of frames of constant section.

The lower bound theorem states that the load corresponding to an equilibrium configuration with arbitrarily assumed values for the redundants is smaller than or at best equal to the ultimate loading—provided that everywhere moments are less than or equal to the plastic moment. Application of this theorem to a continuous beam or frame requires that the structure first be made statically determinate. Then, the moments for that condition are combined with the moments produced by the redundants, which are kept in general terms. Next, values of the redundants, that are necessary to form plastic hinges are computed from the equations for equilibrium. Finally a check is made to assure that sufficient hinges are formed to convert the structure to a link mechanism.

• Design of tier buildings—Walter Weiskopf, consulting engineer, Weiskopf & Pickworth, New York City, discussed the application of plastic design to multistory buildings. He doubted its economy except where horizontal forces are large, requiring rigid connections. Then plastic design would be superior to elastic theory, he said. He also suggested that application of plastic design to semi-rigid connections would be a worthwhile field for research.

The conference also witnessed a test of a two-span rigid-frame in the new Fritz Engineering Laboratory. Subjected to horizontal and quarter-point vertical loads, the frame developed the ultimate load predicted by plastic analysis.

With $88-million channel bill signed . . .

Gulf Port Has Boom Abuilding

Multi-million-dollar port and industrial building programs were forecast in New Orleans after President Eisenhower signed a bill authorizing construction of an $88-million shortcut ship channel from New Orleans to the Gulf of Mexico.

Signing of the bill late last month culminated a vital phase of the 10-year campaign by New Orleans and the Mississippi Valley for a tidewater seaway to the Gulf.

Louisiana's Rep. F. Edward Hebert, the main protagonist of the bill, said the hardest battle has been won. "Now," he added, "the next step is to get the money."

The immediate target, according to the congressman, is to obtain $300,000 "planning money" by the end of the present fiscal year.

Total cost of the project has been estimated at $156 million.

In addition to construction of the 70-mi, 36-ft-deep channel, the seaway also will include a turning basin and will open some 12 mi of water frontage for industrial development. It is expected to trigger a proposed $35-45 million terminal construction program by the Port of New Orleans.

The Mississippi River-Gulf outlet recommended by the Corps of Engineers will provide a safe and straight ship route between the Crescent City and the Gulf. It will cut the present distance by some 40 mi and will result in an estimated saving of more than $1,500 per trip for ocean-going vessels. The present meandering river route is 110 mi from port to deep water.

In New Orleans, engineers for port interests first drew plans for a dream terminal in 1950. The channel authorization brought the blueprints out of filing cabinets and back into active study.

Port plans are for a complete and compact facility to be built near the intersection of the tidewater channel and the existing industrial canal. There would be wharves and transit sheds with wide aprons, shipside railroad tracks, cargo handling equipment with roadways, parking space, railroad storage tracks and other features.

Port officials emphasize that there are no concrete proposals as yet and that there probably will not be until the channel is more nearly a reality.

Planning and surveying of the channel will take an estimated two or three years. During that time, according to Congressman Hebert, an additional $450,000 will be sought to complete the planning.

After that comes the securing of the $88 million authorized and the beginning of construction. Actual construction work is not expected to start before late 1958 or 1959.

M-K Gets Dam Job

$21-million contract let on Noxon Rapids project

Morrison-Knudsen Co. of Boise, Idaho, has been awarded a $21-million contract to build the concrete and earthfill Noxon Rapids Dam for Washington Water Power Co. Work will begin immediately on the dam and powerhouse on the Clark Fork River in the Columbia Basin about 40 mi downstream from Thompson Falls, Mont.

The contract does not include turbines, generators, electrical equipment, transmission lines and other features which will run the total cost of the project to approximately $87 million.

Morrison-Knudsen was lowest of seven bidders, according to Kinsey M. Robinson, President of WWP. Robinson said the contractor will require a work force of approximately 2,000 men during the peak construction period.

The 400,000-kw project is scheduled to turn out its first power in September 1959. The dam will be more than 4,700 ft long and will rise 190 ft from bedrock in the river. The contract for site preparation was let in December 1955 for $2.5 million, and more than $7 million worth of contracts had been awarded by mid-January for work at the project site, as well as a contract for relocating 17.9 mi of the Northern Pacific Railroad in the reservoir area.

The construction schedule calls for building two cofferdams following the high water periods in 1956 and 1957, and completing the first stage of the concrete spillway by mid-1957. The intake portion will begin by November 1957 and the powerhouse section will be started by the end of 1957.

The major portion of earthfill wings for the concrete dam center will be started this summer and completed by the end of 1958. The first of four generators (each producing 100,000 kw) will be operating by September 1959 and the fourth unit is scheduled to be on the line no later than June 1960.

Equipment designers discuss methods for . . .

Cutting Maintenance on Earthmovers

An ENR Staff Report

For the next few years, the earthmoving contractor's equipment probably won't look much different or have more rated horsepower than the rigs he can buy now.

But the machine he'll get will be one that's easier to service, will require less repair and will get more useful work out of its power plant.

That's the distilled opinion of about 1,000 of the construction equipment designers who met to discuss and trade ideas at the annual Earthmoving Industry Conference, sponsored by the Central Illinois Section of the Society of Automotive Engineers at Peoria.

The discussions—both official and unofficial—very clearly confirmed the trend visible at the same meeting a year ago, and repeated at the recent meeting of the men who sell the equipment, the Associated Equipment Distributors (ENR Feb. 9, p. 23). The accent is now and will continue to be on service and maintenance.

Which isn't to say that the designers have given up in their search for the new and spectacular. Scarcely an engineer present wasn't talking—somewhat guardedly—about experiments with gas turbine-driven prime movers, new methods of operating scrapers without cables and new developments in tires and lubricants. But the talk was in terms of the future, rather than any immediate development.

• **More profit for the customer**—F. A. Groos, of the Caterpillar Tractor Co. summed up the problem and objectives of the designers.

"Right now, contractors figure that 25% of the bid price must be assigned to servicing and maintenance. That is divided roughly into a third for parts, a third for labor, and the remainder almost equally between fuels and lubricants and the shop itself and the tools it needs for repair work. If we cut into the cost, we can make more profit for our customers and more actual work for their customers per dollar spent."

H. M. Bidwell, assistant chief engineer for Allis-Chalmers Mfg. Co., had more to say on the subject: "Improvements in metals, oils and greases can be a great help in improving and cutting the cost of maintenance—and it has to be a dealer-user-manufacturer combination that will solve this problem.

So seriously does the SAE take the maintenance problem, in fact, that it was announced that the organization had set up an "ease of maintenance" committee to consider such problems, as well as to consider ways of remedying the current shortage of mechanics.

• **Ways to improve**—In and out of the formal sessions both maintenance and serviceability were emphasized.

They spoke of such things as paying attention to parts of the machine that act as natural dirt catchers—and eliminating them, or making them easily accessible for cleaning; of caps for fueling and oiling that won't get lost; of using dip-sticks instead of sight gages (and putting them where they can be found); of parts so designed that they cannot be assembled incorrectly; of reducing the number, and kind, of greases used on various parts.

And they heard a man from the job make the same comments. Said Rufus S. Kirk, County Engineer of Sedgwick County, Kan.:

"You can run away from us too quickly on size and power. That's not what we want primarily. We want a machine, for example, that doesn't cost too much but can give us a more uniform road surface; one that doesn't make so much noise and vibrate so much for the operator—one with better mufflers, for instance.

"And for our special needs—how about automatic back-up horns on graders and other equipment, and mechanical, easily-seen turn and maneuvering signals?"

It wasn't only the scraper and prime-mover men who were concerned with maintenance, of course—and they weren't the only ones thinking about ways of getting better performance and more use out of their machines.

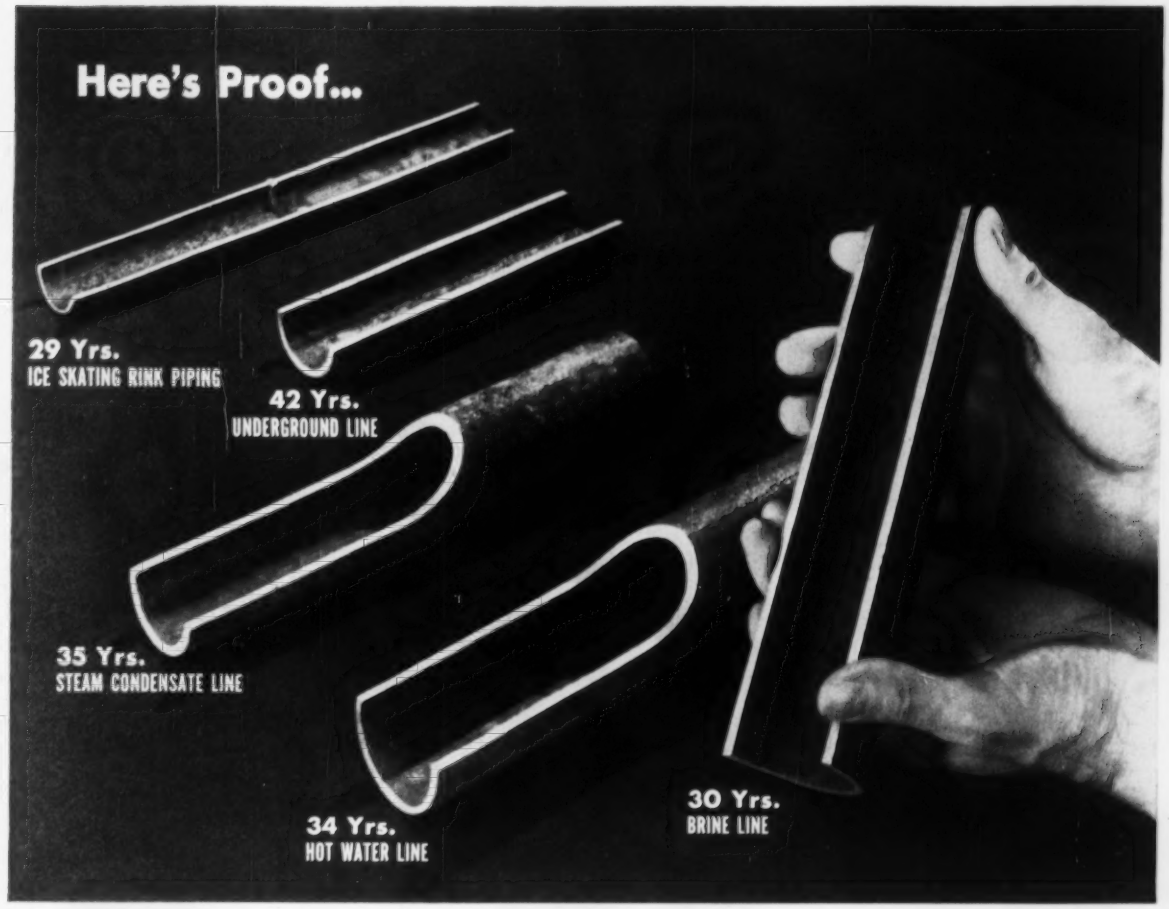
Shovel men, for instance, spoke of a trend toward higher and longer reach for their machines, and told of their experiments—on operating models—with new metals and new types of fabrication to extend the capabilities.

Tire men spoke of yet bigger tires to give better flotation and traction for the machines. And components manufacturers discussed improving such things as means of affixing valve stems to rims where they wouldn't be clipped off easily and of better means of adapting the new tubeless tires to existing machines.

High-Priced Highway Gets a New Link

Dedication, on April 4, of 3.6 mi of the $118-million Newark Bay-Hudson County Extension of the New Jersey Turnpike, started traffic moving over the most costly stretch of highway in the country. In the newly opened section is a 9,560-ft-long high-level bridge with a channel span of 400 ft and clearance above the channel of 135 ft. The bridge structure, alone, cost more than $20 million.

About 4.6 mi of the $14.5-million-per-mile extension is still under construction, and its completion this summer will provide a direct toll link between the turnpike at Newark Airport and the Holland Tunnel that connects New Jersey with downtown New York. More than 68% of the extension is on reinforced concrete trestle bents. Most of the columns were cast in single lifts with continuous casting.



WROUGHT IRON PIPE Saves because it Serves longer

True, there's no set rule for predicting how long a pipe material will last in any corrosive service. But there are a lot of mighty dependable clues. The most practical and dependable of all is *service under actual field conditions.*

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The answer is documented in the pipe sections shown above. Here you see *actual* samples taken from wrought iron pipe installations in a variety of services. Some of these sections came from buildings that were being torn down. Some were actually cut from in-use installations by our laboratory staff. These sections are interesting not only from the viewpoint of service life, but also pipe condition.

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Our bulletin, *Piping for Permanence,* tells more of this story, and covers a variety of services where wrought iron pipe saves because it serves longer. Write for your copy.

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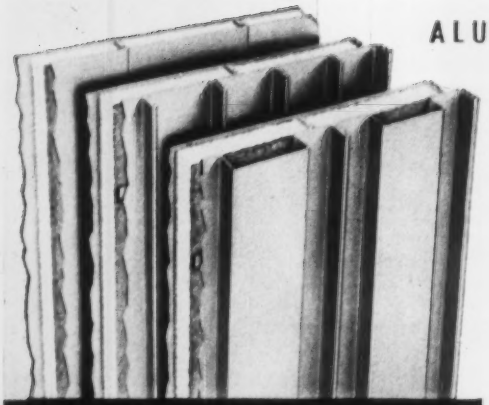

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Chicago Skyway

First bids received on $88-million toll project

Bids were opened April 3 for furnishing and fabricating 7,700 tons of structural steel on Chicago's Calumet Skyway Toll Bridge project. There were three bids: Bethlehem Steel Co. was the apparent low bidder at $3.22 million. U. S. Steel's American Bridge Division was second with a bid of $3.3 million, and Allied Structural Steel Co. was third at $3.39 million. Although the low bid was 10 to 15% above the engineers' estimates, according to Public Works Commissioner, George L. Demment, the three bids were in close agreement. Allied Steel's bid was only 5% above Bethlehem's while all three bids reflect the increasing demand for structural steel in the Chicago area.

The 7,700 tons of steel will build about 4,700 ft of steel trestle, to carry the divided roadways of the project. The trestle will extend from the state line northwest to Ewing Ave. Bids had also been advertised for construction of the reinforced-concrete, asphalt-surfaced roadways for this section. But on Mar. 29 the city cancelled that call, and will take bids for the work at a later date.

Bids were also opened on April 6 for furnishing and erecting a total of 3,225 tons of steel on the same project. Low bidder was the Mt. Vernon Bridge Co. whose bid totaled $1,926,760. The other bidders were: Bethlehem Steel Co., $1,974,325; U. S. Steel Corp., American Bridge Div., $2,003,015; Allied Structural Steel Co., $2,076,250.

This contract covers both carbon and silicon steel which will be used in making deck trusses, plate girder floor beams and rolled beam stringers for the job.

The material on which bids were opened April 3 consisted mainly of welded bents of wide flange beams and structural plates and rolled beam stringers.

This will be the first construction contract in the $88-million, 7.6-mi toll project which will extend from a connection with Indiana's East-West Toll Road at the Illinois-Indiana state line to about 63rd and State St. on Chicago's South Side.

Two Engineering Leaders on Eisenhower's Science Board

Leaders of 17 national organizations, including two representing engineers, were named by President Eisenhower last week to a newly created committee to "foster the development of more highly qualified technological manpower."

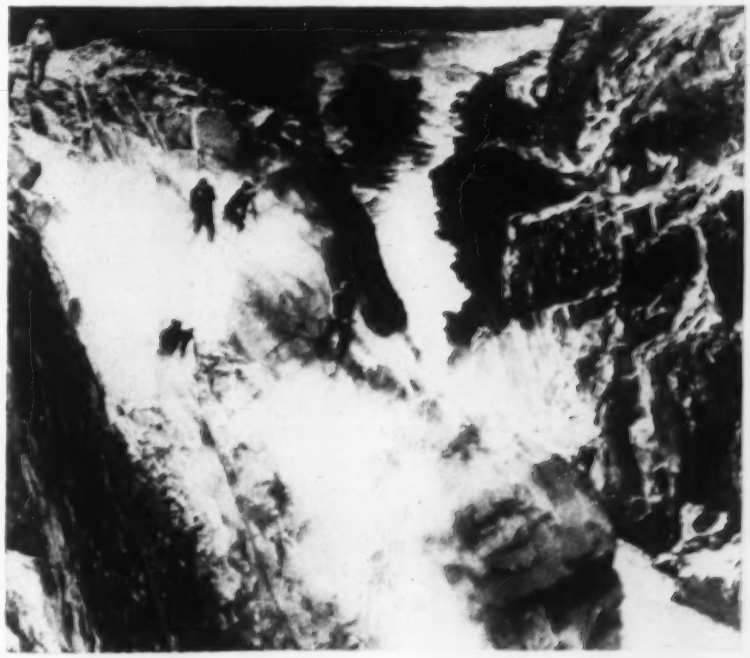
The President appointed Howard L. Bevis, President of Ohio State University, as chairman of the new organization and Eric A. Walker, Dean of the College of Engineering and Architecture, Pennsylvania State University, as vice chairman. From engineering organizations, the President drew Thomas H. Chilton, President of Engineers Joint Council, and Maynard Boring, President of the American Society for Engineering Education.

As members of the "National Committee for the Development of Scientists and Engineers" they will serve with leaders from business, labor, education and the professions in carrying out this assignment from the President:

- Help the federal government pinpoint problems holding back the development of better qualified scientists and engineers.
- Stimulate grass-roots discussion and action programs to reduce the shortage of trained technical manpower—acting as coordinator and the main font of information on the problem for all interested non-government groups.
- Spark widespread public understanding and support by publicizing the problem and its possible solutions.

This country's military security and continued economic growth will suffer, the President warned, unless means are found to increase the supply of skilled technical manpower.

"The basic responsibility for solution of this problem," the President declared, "lies in the concerted action of citizens and citizens' groups organized to act effectively" rather than in the government.



Business as Usual Despite Altercations

Apparently unmindful of the legal battles swirling around $146-million Mayfield hydro project, rock drillers are producing a swirl of their own on an 860-ft tunnel that will carry water to the powerhouse.

In January a state Superior Court judge announced he would grant an injunction preventing further work on $15 million worth of contracts for Tacoma's project on the Cowlitz River. This ruling was based on the obscure fact that the Cowlitz was once navigable and a 1909 law prohibited interference with such water transportation (ENR Feb. 2, p. 27).

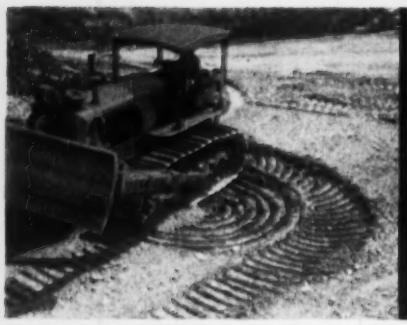
When injunction-signing time came, the judge backed down and allowed construction to continue until the Washington State Supreme Court would rule on the City of Tacoma's appeal. A hearing is to be held on June 25.

In addition to providing $7 million worth of fish protection devices (ENR Mar. 22, p. 28) at Mayfield, Tacoma has made known its willingness to build a portage at the site to meet court objections on the navigation question. The fish problem, incidentally, may result in another legal tangle for city officials.

But through it all, construction is going right ahead. About 200 men are on the job, excavating for the powerhouse and penstocks.

"New OLIVER OC-18.

You'll like these Power-Turn features.

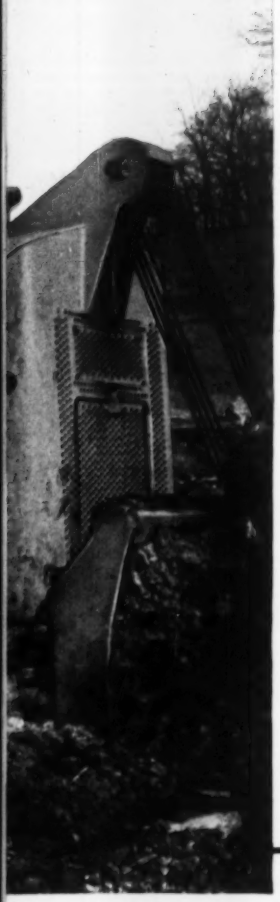


1. Spot turns are made with positive track lock and automatic declutching of power on pivot track. Power on opposite track remains at normal speed. You can spin on a dime!

2. Gradual turns of any radius. You can slow one track as much as you please while keeping power on both tracks; no loss of pulling power on turns... no cross-steering on side-hills.

3. Instant power change from high to low without declutching. Planetary reduction drive decreases speed 38% ... increases drawbar pull up to 60% ... saves time on every move.

.Speeds our operation at least 35%"



"POWER-TURN gives us better steering, easier maneuvering, bigger production"

So says Mr. Lenzino Lenzi, President of Monongahela Enterprises, Inc., strip miners near Pittsburgh, Pa., about the extreme maneuverability and high working speeds of the new Oliver OC-18.

After 7 months' experience with the new OC-18, Mr. Lenzi has this to say about POWER-TURN: "Instant choice of speeds (without declutching) makes the Oliver OC-18 a standout in this department. The air controls make easy finger-tip steering for either spot or power turns. It's the finest all-around tractor we ever had!"

POWER-TURN is the biggest news in crawler steering in over 35 years! Yet it is only one of over a dozen important improvements on the new OC-18. Powered by a 161 h.p. diesel with outstandingly fine torque characteristics, it's the kind of tractor that pays back your investment with interest.

Before you decide on any tractor of this size, get the facts about the new OC-18—finest big tractor in Oliver history. Ask your dependable Oliver Distributor for complete information. See him today.

Ask for this new bulletin

Bulletin A-1044 gives you the whole story about Oliver's amazing new Power-Turn. Your Oliver Distributor will gladly send your free copy. Or write us today.

power turn
OC18

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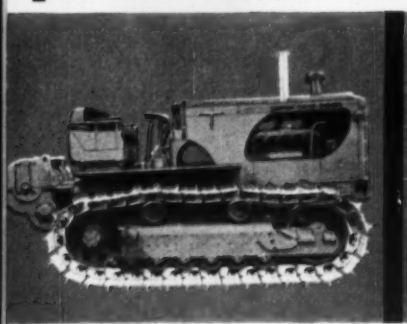
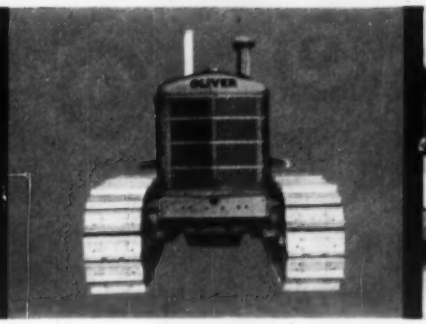
.plus a dozen more big improvements!



4. Antifriction bearing wheels are used throughout the entire track wheel system. No more lubrication worries; positive seals permit these wheels to go 1000 hours without greasing.



5. High clearance lets you roll over rocks and stumps that would stop other tractors. The OC-18 with parallel-mounted openings, has the highest ground clearance for any tractor of its class.

6. Finger-tip air controls make it the easiest-operating big tractor in the business. No tugging and yanking of steering controls. This better control is standard equipment at no extra cost.

Conference keynoter . . .

Fair Faces the Issues

"These are the signs of the time. Sanitary engineers should read them carefully, determine upon the true needs, and make their voices heard in the halls of parliament."

So spoke Gordon Maskew Fair, Harvard professor, pundit and leader among sanitary engineers (ENR Dec. 2, 1954, p. 52), as he concluded a keynote address last week in Chapel Hill. He spoke to the Fifth Southern Municipal and Industrial Wastes Conference at the University of North Carolina, attended by 250 regulatory officials, municipal and industrial wastes engineers, consulting engineers and educators.

Highlights of his talk may fan sparks in several long-smouldering controversies:

Of Water Law

Reappraising the nation's water laws, Professor Fair warmed to his subject with a deftly-worded review of the two existing philosophies—the eastern states' riparian rights doctrine and the western states' doctrine of appropriative rights. He took note of present pressures in some eastern states to adopt the prior appropriation doctrine, due, he felt, to the increased call for supplemental irrigation, and then warned both East and West that attempts to raise farm income through increased supplemental irrigation may block the more profitable—to the over-all economy—use of water for industrial production.

Of Water Supplies

Turning to the waste disposal problem, Fair described two schools of thought relative to the preservation of purity of municipal water supplies —the purists and the dependers on modern treatment.

"The conflict between the two schools inheres in what have been called concepts of innocence and repentance. One school insists upon an innocent water, the other is willing to accept a repentant one. Justification for a repentant water is the high cost of clean water supplies.

"It seems to me that sanitary engineers will place themselves in an equivocal position if they fail to support the thesis that unpolluted upland and ground waters should be searched out and maintained for drinking water supplies wherever it is possible to do so. The use of heavily polluted waters should be of necessity rather than choice. A city should boast that its water supply is best, not cheapest. The economics of the marketplace should not enter into the decision. Considerations of esthetics and hygiene should control.

"Even where water must be impounded and conduits must traverse long distances, or where water must be pumped from the ground, the cost of development of the source remains but a small fraction of the total expediture. By development of regional water schemes, costs can be shared. Regional, rural, or cross-country water supply, which has engaged the efforts of European water engineers in considerable measure during the past decade has, indeed, received little attention in this country. It is worthy of more thought."

Of Water Pollution

"It is one of the purposes of water sanitation for water supply to terminate in sewage disposal and not of sewage disposal to terminate in water supply. To keep the right perspective, we should remember how we shudder at fecal matter deposited upon paths and streets in underdeveloped countries. Might this not arouse some qualms about human excreta being deposited in our water courses in our highly developed civilization?

"It should be an axiom of sanitary engineering, therefore, that the imposed pollution load should be removed before carrying water joins its sister waters. Discharge into natural drainage channel, although it is called disposal by dilution, seems to deny the fundamental responsibility for unloading undesirable constituents of waste waters. In my opinion, all sewage and industrial waste water should be given primary treatment before it is allowed to enter a receiving water, and this should be followed by complete treatment as soon as possible.

"Heavy draft upon underground water resources has resulted in dangerous salt water intrusion into fresh water strata. Putting waste water to work in forming a barrier against salt water intrusion has much to commend it. Both waste water spreading and waste water injection into underground permeable formations need further study in this connection. The tremendous purifying power of the soil, as well as the self-purifying power of surface water, should help us to balance our water economy."

Prof. Gordon M. Fair

Of Industrial Wastes

Professor Fair continued his fire on industrial waste disposal after reiterating the importance of providing water for industry, even at the expense of reduced irrigation consumption. Said the forceful keynoter:

"Much of the spirit of early Massachusetts legislation still persists in the administration of industrial pollution abatement. I have reference especially to the policy of permitting pollution of a stream by industry for as long a time as no economical means of waste water treatment is available; also of placing upon the public authority or enforcement agency the burden of proof or of research rather than upon industry itself. Such a policy puts a premium on dilatoriness rather than diligence in finding suitable treatment methods.

"Among the more unfortunate attributes of industrial wastes, aside from immediate toxicity to man or beast, is the ability of ever-increasing numbers of these wastes to produce bad and persistent odors, tastes and colors in water into which the waste matters are emptied. I hope that we shall never submit to the suggestion contained in a recent book on industrial waste treatment to the effect that since municipal water treatment processes are often incapable of destroying wastes, odor and colors introduced by industrial wastes, the public must learn to tolerate conditions that are certainly unpleasant though not necessarily harmful. As I have said in my review of this book, one is reminded of the familiar quotation by Vanderbilt, 'the public be damned'."

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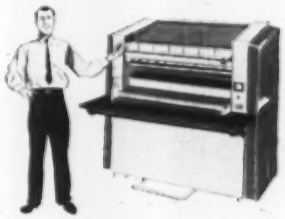

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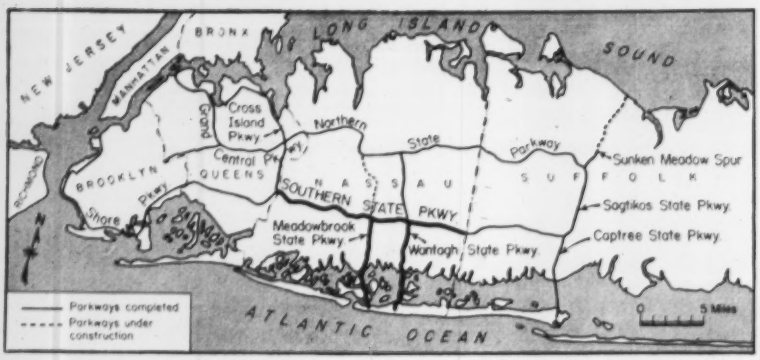

Long Island—playground for its own as well as New York City's population—found its superhighway network outmoded. Officials found an answer . . .

Road Crowded? Double It—and Then

When the fantastic population growth of Nassau County, plus the tremendously increased use of state park facilities on Long Island by motorists from the city, began to strangle the island's vaunted parkway system a couple of years ago, New York's many-hatted Robert Moses undertook to paraphrase an old saw.

Said Moses: "The world is beating a path to Jones Beach."

Speaking in his capacity as president of the Long Island State Parks Commission—one of the nine major posts he holds—Moses was right in more ways than one. At his insistence, and over the original objections of local residents in 1926, Jones Beach was built—and his has been the driving genius behind the construction of a vast network of parkways on the island

ENGINEERING MARVEL of 25 years ago was the Southern State Parkway—one of the nation's first controlled access roads. But by 1951, with traffic at 20,000,000 cars a year, even added divider couldn't prevent jams, accidents.

DOUBLING UP was the only practical answer. Handsome old-stone-faced reinforced concrete overpasses were duplicated

Add Ten Million Cars

to provide access to the beach and other recreation facilities.

But Nassau County population leaped from 400,000 in 1940 to 1,050,000 in 1955; its motor vehicles in the same period increased from 110,156 to 430,000. Suffolk County, just to the east, also grew mightily. And more and more New York City residents availed themselves of Mr. Moses' parkways. Traffic on the Southern State Parkway—opened in the late 1920's as a four-lane, controlled access road—jumped from 4,000,000 cars in 1939 to 20,000,000 in 1951, to 26,000,000 by 1955. Engineers predict it will get near 30,000,000 this year.

Only one answer seemed feasible—build a completely new road, parallel to the existing one. Since state and federal funds weren't available, a 10-cent toll was effected to service $40 million in bonds to finance the work.

In a little over two years this work has been done: The Southern State

(with stone from the original quarries), and a completely new four-lane highway built, parallel to old road.

NEW MARVEL is the end result—an eight-lane, widely-divided highway, with good sight distances, better designed access at intersections, lanes up to 14 ft in width, compared to old road's 11-ft lanes.

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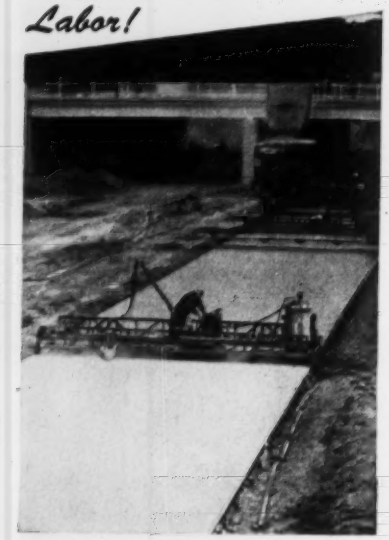

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TOLL INSTALLATION is one of the largest in the U. S.—its 16 lanes collect 10 cents each from all cars to pay off bond issue that financed improvements. Booths are connected by underground tunnel so that collectors needn't dodge through lanes.

OTHER END OF THE ROAD, at the eastern extremity of the long barrier sand reef that forms Jones Beach and other resort areas, is the two-mile-long Captree Causeway, a two-lane structure across Great South Bay.

GOAL FOR MILLIONS using the parkways is famed Jones Beach, crowded here on a summer Sunday. Only access is by automobile or bus. Area provides ocean (upper left) and bay (lower right) bathing, a marine stadium, other attractions.

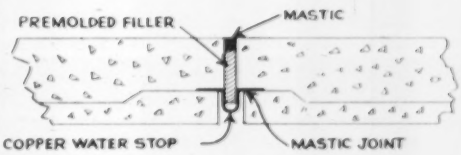
is now an eight-lane divided road for its first five miles, six lanes for the next eight miles, and remains at four lanes into Suffolk County (see map).

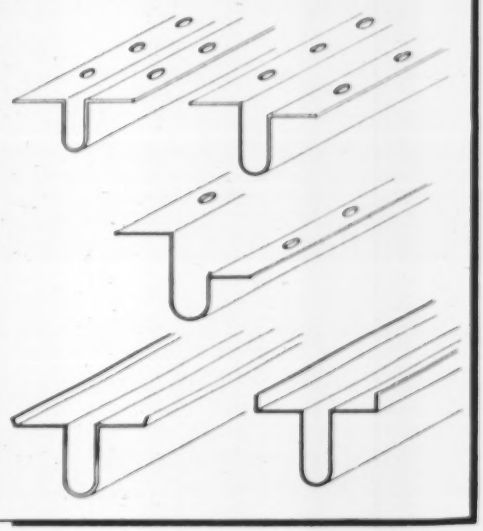
Additionally, two causeways to Jones Beach have been rebuilt and widened, the Wantagh and Meadowbrook Parkways widened, and a new connection between Northern and Southern parkways has been started.

Under Moses and his fellow commissioners—Herbert Bayard Swope and Angier Biddle Duke—the work was supervised by Arthur E. Howland, general manager of the commission, and Sidney M. Shapiro, chief engineer.

what they're doing with REVERE SHEET COPPER

INSET PHOTO ABOVE shows one of the many types of water stop expansion joints used on the N. Y. State Thruway and made of 20 oz. Revere Sheet Copper. 8 ft. lengths were presoldered into 24 ft. lengths before placing in joint, keeping the installation quick and simple. Detail is shown directly below with a few of the many types of joints used.





Water stop expansion joints on many bridges of

N. Y. STATE THRUWAY

are made of 20 OZ. REVERE SHEET COPPER

Ordinarily, when you drive over a bridge you don't think of expansion joints. But their function is as important as the concrete reinforcing rods or other members from which bridges are constructed. That's why copper was selected. It does not rust, rot or deteriorate, concrete does not bother it. Copper readily expands and contracts with temperature changes. It flexes to take every movement of the concrete slabs and the stress and strains year after year without breaking down, is readily worked into any desired shape and a cinch to join by soldering or brazing. Construction engineers and sheet metal men tell us, in a spec. there is no "or equal" for copper.

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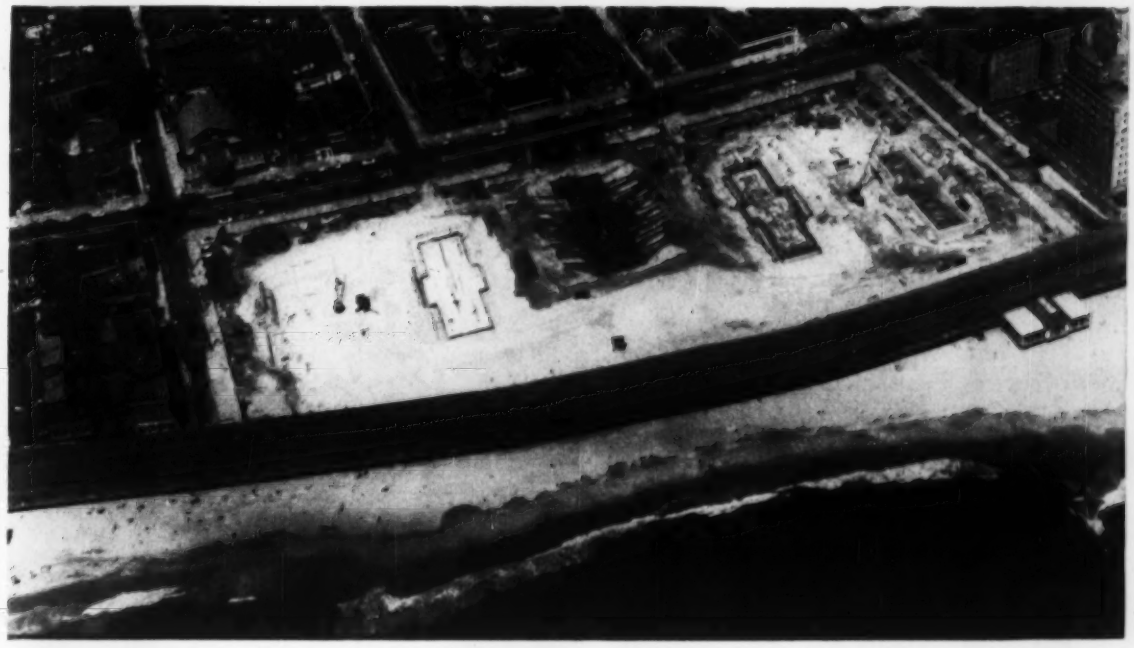


Beach Front When wellpoints dewatered foundation for housing project, recharging outside became necessary to prevent damage to neighboring structures

Solution to Wet-Foundation Problem

James D. Parsons, Associate Partner, and Samuel Heyman, Formerly Soils Engineer, Moran, Proctor, Mueser & Rutledge; David A. Werblin, Vice President, Wellpoint Dewatering Corp., New York, N. Y.

When it's necessary to remove groundwater from an excavation to work in the dry, a problem sometimes arises because of the effect of the drawdown on adjacent structures. Recharging, or pumping the water back into the ground, outside the excavation is one way of overcoming this drawdown.

That's exactly what engineers did in building the New York City Housing Authority's Coney Island Houses, on the oceanfront of the city's famed beach resort.

The project consists of five 14-story "middle-income" apartment houses of reinforced concrete construction. It occupies a three-block-long site along the Coney Island boardwalk, about 150 ft from the Atlantic Ocean. Because of their weight and the unfavorable subsoil conditions, the buildings were designed to rest on heavy, buoyed reinforced concrete boxes, founded 10 ft below mean sea level.

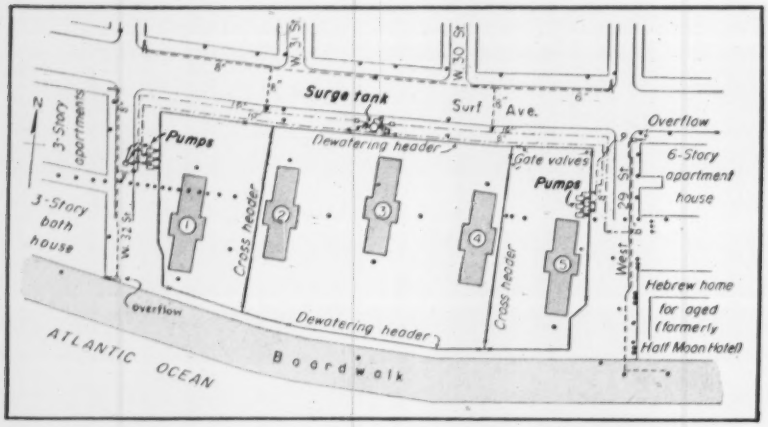
To build these structures in the dry, the groundwater level had to be lowered more than 10 ft. But it was found that several large structures in the immediate area—notably the 15-story Half-Moon Hotel and a large apartment house—supported on spread footings, might be affected adversely. Evidence indicated that the lowering of the groundwater level might produce excessive settlement in these structures.

The answer had to be some means of maintaining normal water level in the surrounding areas as close as 110 ft from the excavation, while at the same time lowering the water level in the construction area.

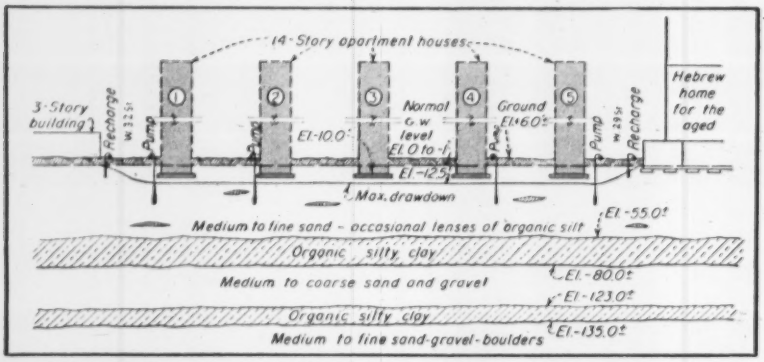
• **Subsoil condition**—Numerous dry-sample, undisturbed and continuous-sample borings made throughout the

DIFFUSION POINTS were inserted below the pavement outside the site for 14-story Coney Island Houses, Brooklyn, to recharge the ground.

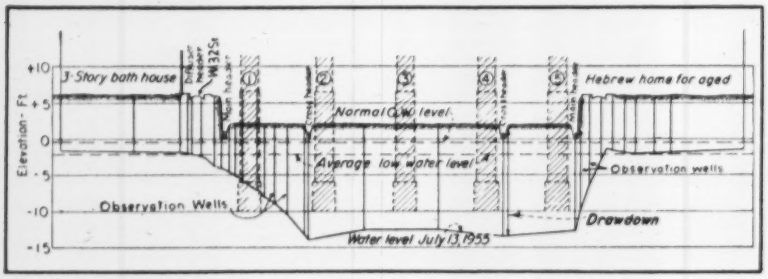
. . . Solution to wet-foundation problem



SITE PLAN—Groundwater observation wells are shown by dots, dewatering headers by solid lines, diffusion headers by dash lines and diffusion feeds by dot-and-dash lines.



FOUNDATIONS for the five buildings, determined by the poor subsoil shown in this section, are buoyerd reinforced concrete boxes.



MAXIMUM DRAWDOWN, indicated by the bottom curve plotted on a cross section through the site, was maintained over a major portion of the area.

area (see locations on the site plan) gave the following data:

There is a layer of beach sand extending from an elevation of about 6 ft above sea level to 55 ft below, but containing occasional thin lenses of soft organic silt up to 2 ft in thickness. From elevation −55 to −80, and again from −123 to −135, are two organic silt beds, which laboratory test demonstrated had been preconsolidated in the past by the weight of an overriding sand dune to about ½ ton in excess of the existing overburden.

Laboratory analyses and studies indicated that the 14-story buildings, if supported on spread footings founded at or above groundwater level or on piles, would create stresses in these deep silt beds well in excess of the greatest stress to which they had been subjected in the past, and excessive settlements would occur. Because of this potential of excessive settlement, the buildings, therefore, had to be either reduced in height—an alternative not acceptable to the housing authority—or founded on buoyed reinforced concrete boxes to provide, through buoyancy, the necessary reduction in stress in the underlying silt beds. The latter approach, therefore, was adopted.

• **Pumping test**—A wellpoint system to dewater the construction site for foundation work was installed. But preliminary to its operation, it was necessary to determine what would happen to surrounding structures:

Investigations indicated that the estimated existing stresses in the organic silt bed under the former Half-Moon Hotel were close to the maximum preconsolidation stresses in the silt bed—thus drawdown of groundwater, with accompanying increase in load on the organic silt, could not be permitted.

To determine the effect of a wellpoint system on the groundwater levels of adjacent areas, a large number of observation wells were installed, both inside and outside the limits of the site, and a test program—pumping from the west cross-header only—was carried out.

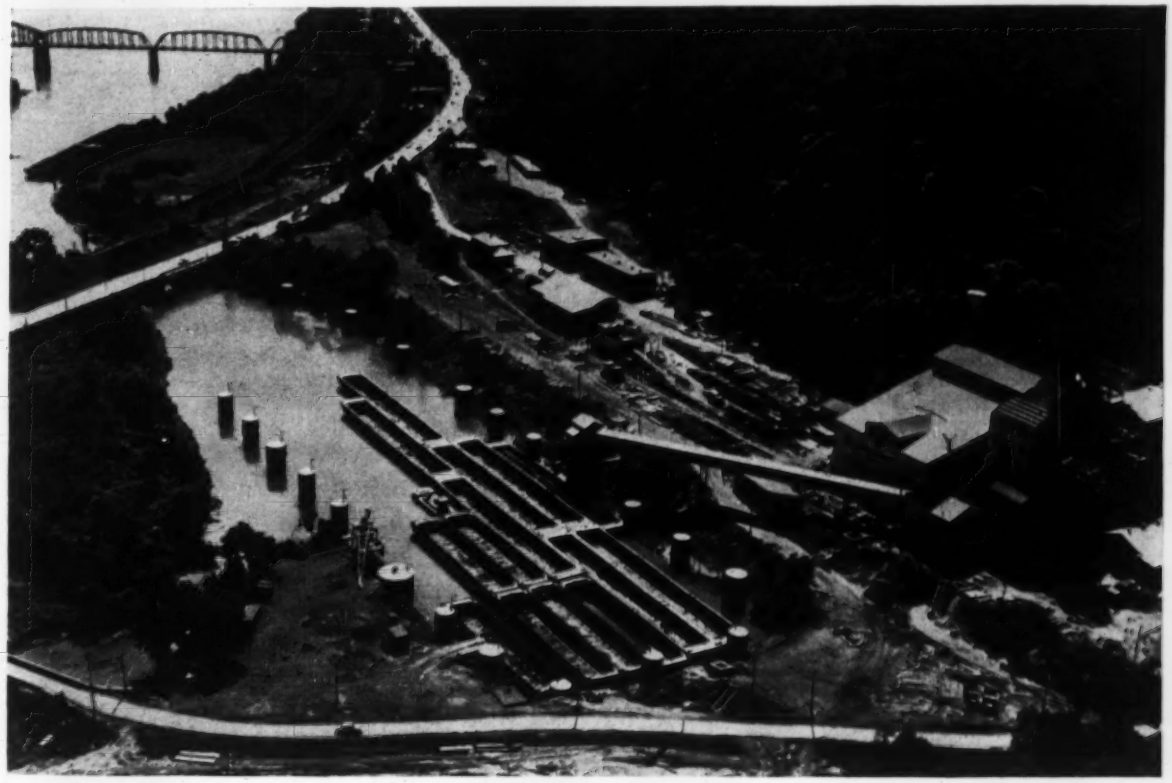
Continuous pumping from this line for a period of two weeks, maintaining a drawdown of from −9 to −11 ft at the header showed these conditions:

The drawdown in the test period, along an axis roughly paralleling the beach, extended back about 1,000 ft from the single line of wellpoints operated. If the pumping had been carried out from the full wellpoint system, a very large area would have been affected.

Toward the ocean, of course, the radius of influence would be less, but in the other direction (north of the site) and in areas to the east and west, the effect might be serious. A drawdown to −8 or −9 ft could be expected under the Half-Moon and Neptune Apartment buildings, only 90 ft from the east header.

• **Put the water back**—A number of methods were considered for maintaining the groundwater at normal levels outside the limits of the site during the drawdown period, including the driving of steel sheeting around the perimeter of the site, or pumping water back into the ground through a peripheral diffusion system. The latter method—diffusion system—was selected as most economical and practical.

In view of the limited evidence available regarding the diffusion method for installations of comparable size and nature, it was decided first to install, as a test section, a 200-ft portion of the anticipated ultimate diffusion system on the east side of the site for a test run. This section was selected as most critical, because it



TWO-WAY HARBOR SERVES HARMAR COAL PROCESSING PLANT

At its new preparation and cleaning plant along the Allegheny River near Pittsburgh, Harmar Coal Company is utilizing the advantages of water transportation in two separate ways. Coal received in barges from another mine is unloaded and added to coal mined at the plant location. Then, all coal from the processing plant is loaded on barges for shipment to a steel mill.

This efficient, large tonnage operation is handled smoothly in a modern harbor constructed by Dravo Corporation. It consists of 25 steel sheet pile cells, two of which form a foundation for an unloading crane and receiving hopper.

This type of waterside facility, pioneered by Dravo, can be adapted to the needs of all industry, large or small—from a single cell to installations over a mile in length. In the last few years alone, more than 75 separate docks have been constructed for chemical and steel plants, coal mines, utilities, railroads and others.

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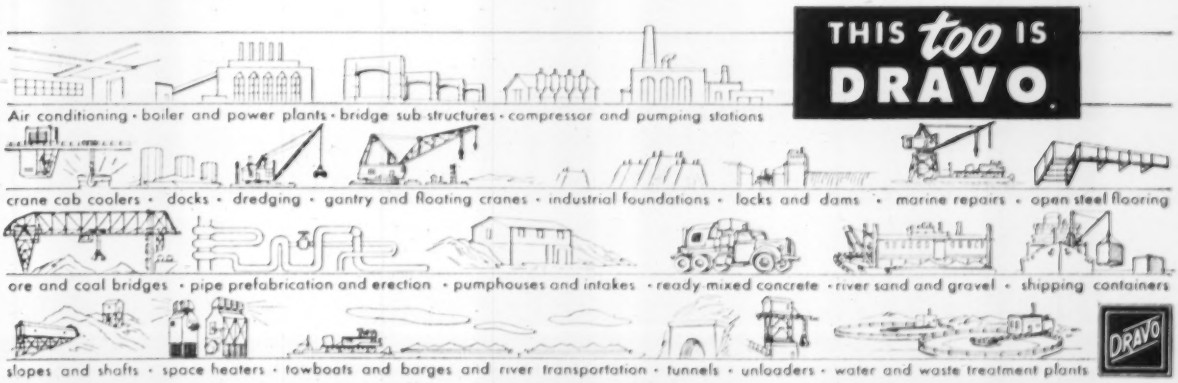
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. . . Solution to wet-foundation problem

borders the two largest existing structures in the area.

Pumping for the test was from a 100-ft section of the wellpoint system located immediately across the street.

As first installed, the diffusion system was much like an ordinary wellpoint system with header pipe, swing joints, riser pipe and wellpoint assembly. Even the diffusion points were fabricated similar to standard dewatering wellpoints, except that the points themselves were capped at the bottom and the ball check valve and jet holes were omitted. Instead of screens about 3 ft in length, as ordinarily provided in wellpoint systems, however, the diffusion points were made up with 8-ft 3-in. screens for adequate discharge area.

The diffusion points in the test section were jetted into position on 2-ft centers. Even though that spacing was probably closer than necessary, it more readily permitted experimentation.

• **Test reveals trouble source**—Before the test section was put into operation, detailed surveys were made of all existing buildings and settlement points established on them for observation. Also, provision was made for hourly around-the-clock groundwater readings in the early stages in each of 135 observation wells established for control.

The test section was operated for about two weeks and, by careful control of the pumping and discharge pressures, readily attained the desired drawdown (see chart, p. 40).

Normal—or slightly above normal—groundwater conditions were maintained outside the limits of the site for the major part of the test period. But during the latter part of the test, pressure in the diffusion line had to be substantially increased—and in some instances it was found that even with higher pressures, the discharge was almost negligible.

Investigation showed this was due to clogging caused by an accumulation of a precipitate of ferrous hydroxide in the diffusion points—perhaps the result of insufficient prior clearing of lines. The compound, however, is voluminous and gelatinous. Colloidal in particle size, it could not be readily filtered.

It was obvious that to provide the diffusion protection needed over a period of several months, facilities had to be developed to overcome this clogging.

• **Final installation**—For central control and economy, the final diffusion system was planned to operate from one pump station (west side), but provision was made for emergency pumping from the east side.

A steel surge tank, 10 ft 6 in. in dia and 25 ft high, was placed in the center of the lines (on Surf Ave.) to provide a constant controllable head on the diffusion header lines, and an overflow pipe connected from the top of this tank to a nearby sewer.

The system was designed so that a portion of the discharge water from the wellpoint dewatering system would be pumped through a 10-in. high-pressure feeder line to the surge tank; from the tank, the water was then distributed by gravity at low pressure to 8-in. diffusion header lines feeding the three-sided perimeter of the site. Any remaining discharge water was wasted to storm sewers.

Vented overflow loops were installed to a height of 7 ft at the ends of the diffusion header lines to control diffusion line pressure to a maximum of 3 psi.

The total diffusion header perimeter was about 1,600 ft, with about 400 wellpoints, spaced 4 ft c-c.

• **Corrosion protection**—The corrosion problem uncovered by the preliminary tests was critical and complex.

On recommendation of H. S. Presier, corrosion consultant, these steps were finally taken:

A limited cathodic protection system was installed in the dewatering header line and diffusion-system piping. This consisted of zinc rods set 4 to 6 ft c-c in the pipe lines to provide the electrical potential necessary to retard galvanic action between the various metals in the system. (The discharge water was a good conductor, though not as briny as sea water.) Cathodic protection was also installed in the surge tank. Furthermore, suitable instruments were placed to check on the effectiveness of this protection.

In addition to the zinc rods, all diffusion feeder and header piping was coated with a special vinyl paint. Diffusion risers were galvanized and coated, and the diffusion screens were insulated from the steel pipe to preclude any electrolytic couple. To filter out insoluble particles, discharge water was passed through large 50-mesh filters on both inflow and outflow sides of the surge tank, and individual 100-mesh filters were placed at each diffusion swing joint.

• **And so to work**—The initial step in the dewatering operation was to balance the dewatering system against the diffusion system—if dewatering got ahead of diffusion, the groundwater table would be lowered under the buildings whose safety was the principal concern of the whole scheme. If water were diffused into the ground in too great a quantity, or under too great a pressure, flooding or serious "quick" conditions would occur in the areas adjacent to the diffusion header lines.

In the early stages, housing authority observation teams monitored the operation on an around-the-clock basis to record the drawdown in the observation wells, and adjustments were often made several times a day.

At first, it was necessary to operate from both east and west pump batteries; but after some experimentation, it was found feasible to operate only from the west-side pumps.

Total water pumped by the wellpoint dewatering system was initially 6,000 gpm, which was reduced finally to about 4,500 gpm in the final stage. Of this, about 3,000 gpm were pumped back into the ground, and the remainder wasted.

Frequent cleaning of the filters was necessary, despite all protection precautions. Initially, most of the material trapped was sand in small quantities—a condition that cleared after a few days. Appearance of the gelatinous ferrous hydroxide and bacteria, however, made it necessary to clean all filters regularly and back-flush the diffusion wells.

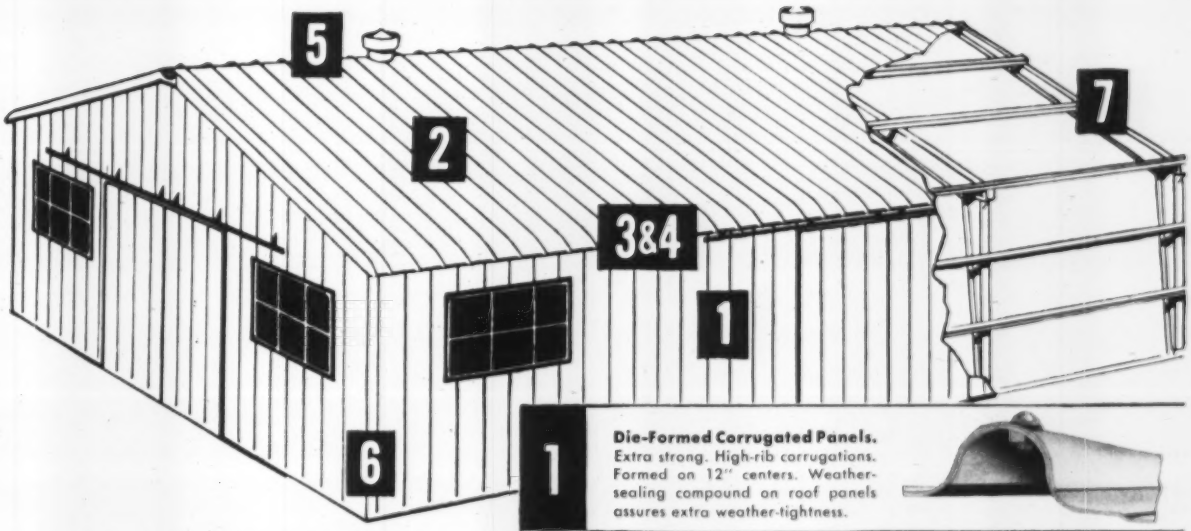
• **Success**—The full system was operated between late June and September, 1955. Foundations for the five buildings were installed in that period.

While a maximum drawdown to elevation —12.5 over the entire site was not required at any one time, this drawdown was maintained over a major portion of the area during later stages of the work. Then, work on four of the foundations was being carried out simultaneously.

Extremely meticulous checking of the structures surrounding the site showed no evidence of settlement or movement, and no damage attributable to the lowering of the water table on the construction site.

• **Credits**—Structural engineers for the housing authority were DiStasio and Van Buren, and Harry M. Prince was architect. Moran, Proctor, Mueser and Rutledge represented the owner as consultants on all phases of foundation work and provided supervision during dewatering and diffusion operations.

General contractor is John A. Johnson & Sons, Inc., of New York City, for whom Michael Mascia was superintendent. Griffin Wellpoint Corp. designed the dewatering and diffusion system, which was installed and operated by its associate, Wellpoint Dewatering Corp—all N. Y. firms.



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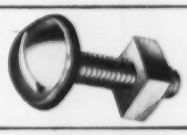

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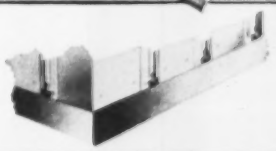

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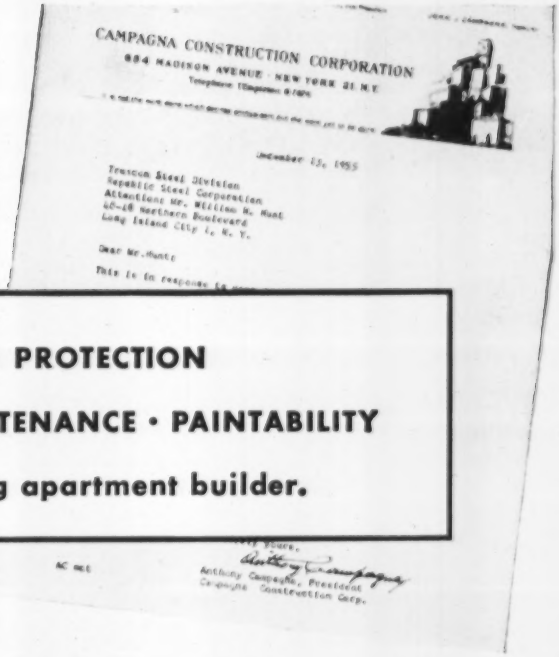
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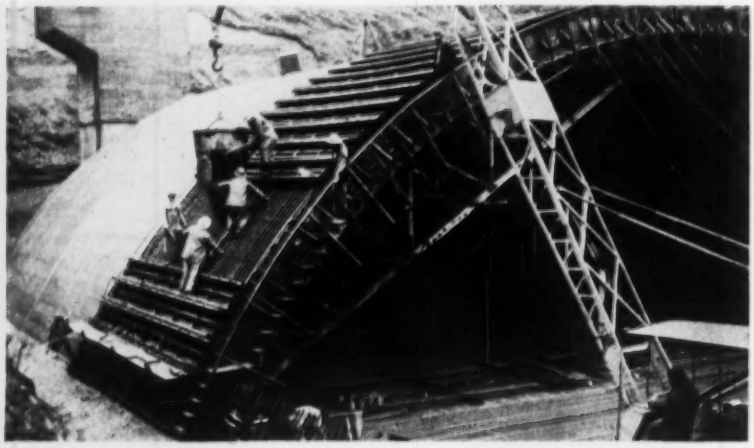
For its nerve center in an emerency, the city of Portland, Ore., is building an underground shelter with arched concrete roof 26 in. thick spanning 84 ft

Self-Contained Shelter for City

Work is nearing completion in Portland, Ore., on an underground civil defense control center that includes a 26-in.-thick concrete arch roof spanning 84 ft. The $500,000 building is being constructed more than three miles from the center of town in a hillside location that will permit the concrete tied arch to be covered with a minimum depth of 5 ft of backfill.

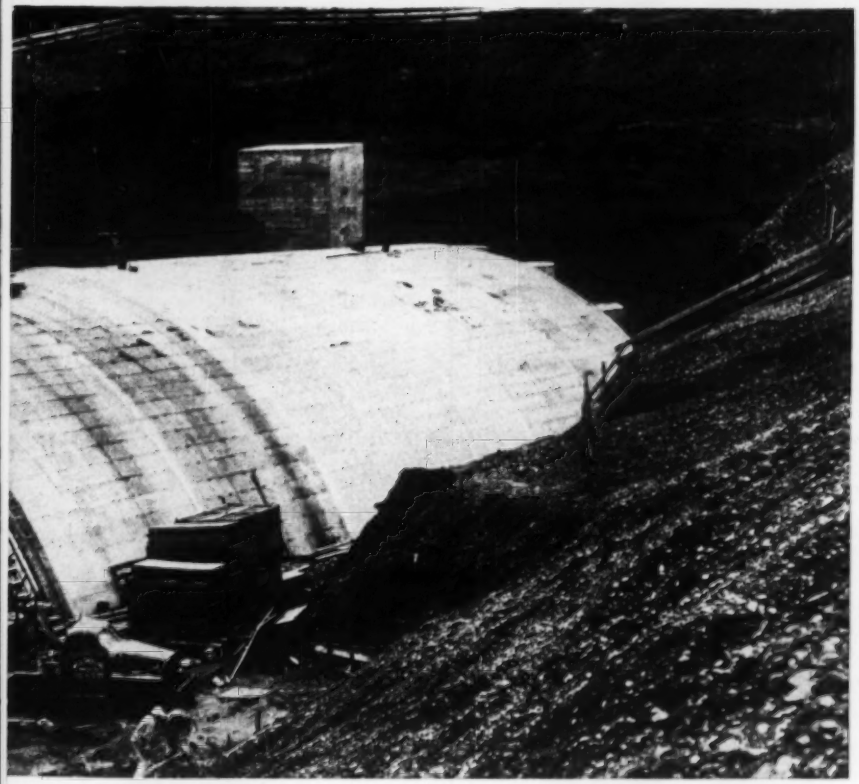
The structure will be the nerve center of the Portland metropolitan area in times of disaster or enemy attack. Besides being the focal point from which all rehabilitation and rescue work will be directed, the center will be the seat of the city government.



CONCRETE IS CAST for 84-ft span arch that is main structural element. Falsework for concreting operations is made of pairs of timber arch trusses that are jacked down on wheels for moving.

The result of three years of planning, the building includes most of the newer concepts of civil defense structures. It is a completely self-contained unit that will, if necessary, house 300 people for a week with no one entering or leaving the unit. And of course, included are such things as automatic standby power and television identification of incoming personnel. But most construction and structural design interest centers on the thick concrete tied-arch roof.

• **Structural design**—The arch is a cylindrical segment with a 45½-ft radius and maximum rise of 28 ft. And concrete thickness is a uniform 26 in. for the 140-ft length of the building. Uniform thickness was selected over tapered thickness—or for that matter a slab and joist or rib system—for several reasons. First of all, considering the 130-pcf soil load alone, design load at the top of the arch is 650 psf. Such a heavy load creates high bending moments at the top. And it would necessitate placing of ribs very close together. Further, uniform thickness results in a saving in form cost. No saving in steel would have resulted in tapering the arch



Here's what it will cover:

- Housing for 300 people
- Water supply
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- Sanitation system
- Kitchen, mess hall, food storage
- Sleeping quarters
- Personnel decontamination facilities
- Security protection by photo-electric cell and TV
- Complete radio and telephone facilities
- Automatic fire detection system
- Automatic heating system
- Filtered air supply for sealed-off action

Government

thickness as the same amount of steel was required at the top to resist bending during construction. Finally, the 26-in.. thickness affords protection against radiation and against close explosive detonation or hard-shell bomb penetration.

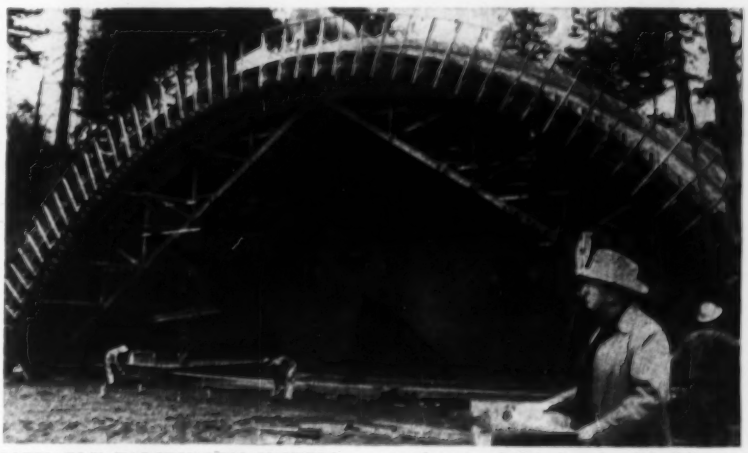
Transverse reinforcing of the arch comprises No. 11 bars on 7-in. centers at each face. Longitudinal temperature reinforcing is provided by No. 28 bars at 12-in. centers. And the transverse bars are tied by No. 3 reinforcing ties at 18-in. centers. Arch steel is lapped at least 24 in., with overlapping steel separated by at least one bar diameter to permit full bond with the concrete.

The arch connection with the foundation thrust block is detailed to provide a hinge-type joint for true arch action. Footings are continuous along each side of the building. They are cast on undisturbed soil that is considered to have 10,000-psf bearing capacity.

The tie across the bottom is formed by No. 11 bars on 5½-in. centers. Tie bar splices are made by double fillet welds at least 12 in. long and including ⅜ in. of fillet. The ties are encased in a 6-in. thick structural slab with at least 3½ in. bottom clearance. Slab is cast on undisturbed soil. On top of this slab is a membrane vapor barrier. Finally, a 4-in.-thick fill slab covers the entire floor area.

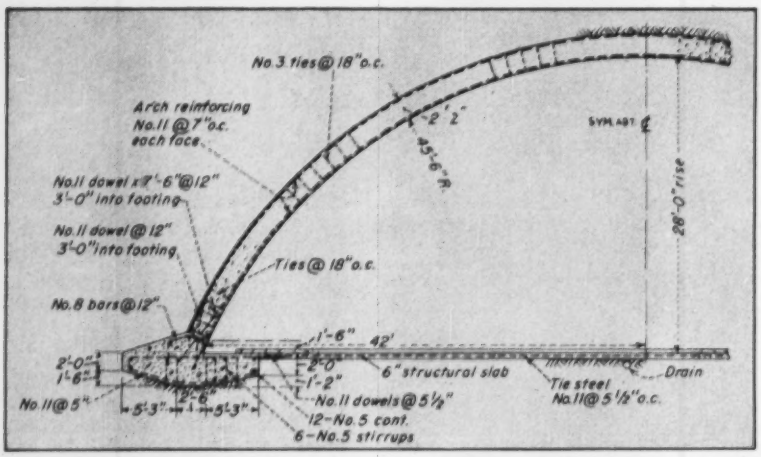
• **Arch construction**—Almost as interesting as design of the concrete arch is the method by which it was cast. In planning the work, the contractor—A. V. Petersen Co. of Portland—had two primary decisions to make. These were (1) how much concrete to cast in a single pour and (2) how to support the concrete arch during casting operations. Answers to both questions came by adoption of a fabricated timber falsework system.

Spanning the 84-ft width were pairs of timber arch trusses connected at the crest of the arch. Top chord of each truss was a glued laminated arch measuring 5¼x14⅜ in. in section. Bottom chord was a 6x8-in. timber. Three sets of trusses spaced on 8½-ft centers provided form support for a 23½-ft length of the arch. Thus, the contractor was able to cast the 140-ft



MOVABLE FALSEWORK SYSTEM permitted entire 140-ft length of building to be cast in six pours each 23½ ft long. A total of 33 tons of reinforcing and 202 cu yd of concrete were used in each pour.

. . . Self-contained shelter for city government



ARCH IS 26 IN. THICK for full 84-ft span. Thickness is needed to support the earth backfill that will be a minimum of 5 ft thick.

length of the building in six pours. Although design permitted casting of an arch section in three increments, the contractor elected to cast an entire arch section at one time.

When work got under way, casting of an arch section was on a two-week cycle. This meant that a pour involving 202 cu yd of concrete would be made on a Wednesday. And the next pour would be made two weeks later. Intervening time was occupied with allowing the concrete to gain strength enough to be self-supporting, moving forms and placing reinforcing steel.

Best time for making a 202-cu yd pour was six hours. And it was necessary to balance the load on the form system as concrete pouring progressed. Thus, a few yards of concrete would be cast on one side of the arch and then a few yards cast on the other side.

The arches were allowed to cure until they attained 2,000-psi strength after four days (design strength was 3,000 psi in 28 days). This permitted the forms to be lowered from the arch on Monday.

Lowering the forms was accomplished by use of ingenious sand jacks. Each timber truss rested on sand confined under pressure in a steel box 12 in. square and 4½ in. deep. When time came to lower the forms, four plugs were screwed out of each box. The carefully graded dry sand then drained out. This permitted the arch falsework to pull away from the concrete and rest on hydraulic jacks. The timber arch form was further lowered by these jacks until it rested on wheels that rode on the thrust block footing. The arch forms were winched forward 23½ ft to a new position. Hydraulic jacks raised the arch to its new position and by quitting time Monday it rested again on sand jacks.

The following day applicators placed a 1½-in. thick acoustical lining on the timber arch form. This required 1½ days to be placed and taped. It served as a form lining permitting reuse of forms without resurfacing. And it gave good acoustical qualities to the finished building.

Next step was placing the reinforcing. This started at noon on Wednesday and was usually completed by late Monday of the following week (each pour involved 33 tons of reinforcing steel). Then on Tuesday the contractor's forces placed the outer arch forms and the assembly was ready for a pour the following day.

Floor slabs were concreted separately. But it was necessary to have the horizontal tie system in place by the time arch forms were stripped.

Backfill has not yet been placed. But care will be needed to prevent unbalanced load on the arch. Electric strain gages have been cast in the concrete at points of maximum stress for use in controlling the backfill.

The building is located in a park, so control of live load is possible.

• **Purpose of center**—The civil defense center results from more than three years of planning by city officials and the design firm. It furnishes space for the full activities of Portland's city government and civil defense organization under emergency operations. This calls for facilities for police, fire, engineering, medical, welfare, warden and headquarters departments. It also furnishes space for liaison with state and county authorities and with the military. And provision is made for press and conelrad (emergency) radio.

The building provides an entirely self-sufficient unit that will house 300 people for seven days without any of them leaving the building.

For 85 ft of the 140-ft length of the building a second floor is provided inside the arch by steel framing. The other 55 ft of length is a large operations room with both side walls (provided at 76-ft width) and the end wall devoted to map space. End wall map covers an area 30 miles in diameter.

In addition to the shell, there is an entrance structure that houses the fan room as well as personnel decontamination facilities and entrance security provisions.

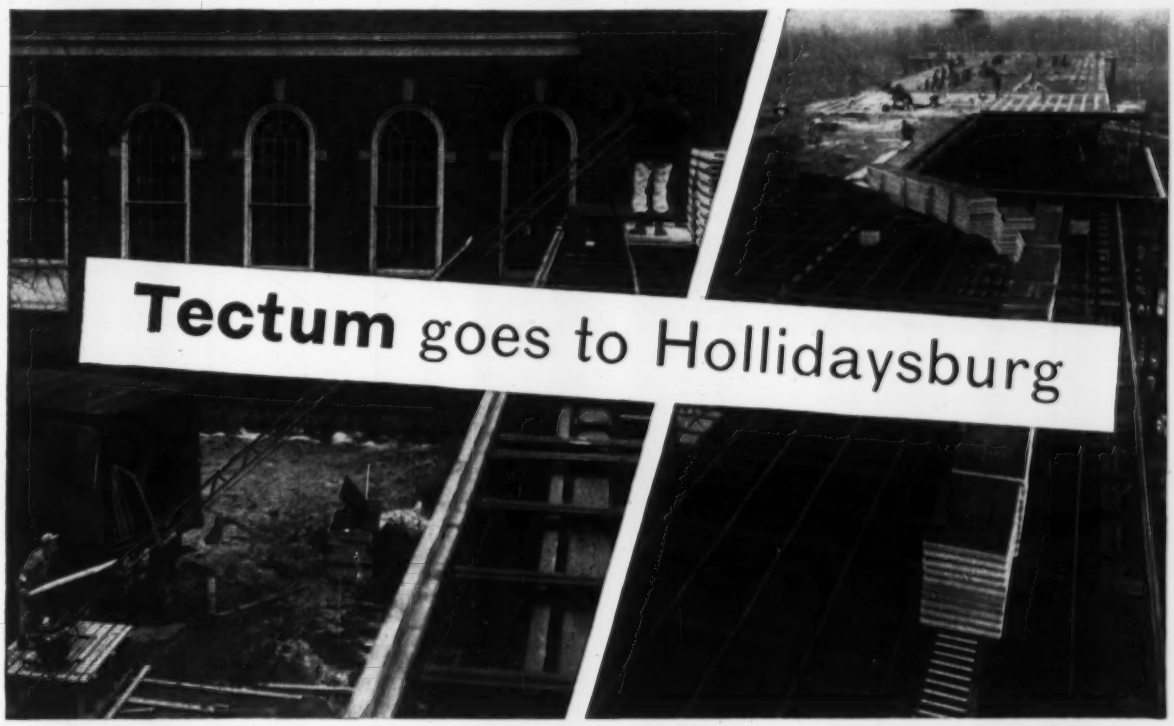
• **Ventilation**—Special attention has been given to the handling of incoming air. As this facility will house a large number of people, a fresh, highly usable air supply is very important. And greatest air demand is likely to come under unfavorable conditions—when outside air may be contaminated with radioactive particles or with biological or chemical agents.

Air is drawn into the building through a shaft that extends a short distance above the ground and has protected openings. The air coming down the intake shaft is taken into the fan room where it can be distributed through two different systems. One system, to be used when the air is not contaminated in any way, diverts the air through standard dust filters and then through cooling and heating coils after which it is distributed through the building by ducts. The other system, which has to be used if the air is suspected of being contaminated, passes the air through a filter that removes radioactive particles and then distributes it to the building.

If conditions are such that outside air cannot be used at all, then the entire building can be sealed off and all air recirculated. In that case, used air is passed through activated carbon filters, freshened by the addition of oxygen, cooled, and redistributed into the building. This recirculated air can be mixed in any desired ratio with outside air so that a very small quantity of outside air may occasionally be drawn to improve the quality of the inside air being reused.

The building is under pressure so that all air leakage is outward, thus protecting against contaminated air leaking in. The entrance has an air lock system so doors can be operated against the pressure.

The entire building is divided into two zones for ventilation purposes. Zone one is for that space ordinarily used from day to day. Zone two is for the balance of the space provided for emergency use. Thus, zone one ventilation is quite light by comparison to the total requirements. Under crash conditions, when this full building will be utilized by 300 people,



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. . . Self-contained shelter

the ventilation load becomes very great. Changing from zone one to zones one and two, is accomplished by merely flipping a few switches that actuate valves and fans to produce the revised ventilation requirements.

As this building is underground, it will experience very little heat loss. Hence, the expected heat load is relatively light. However, under normal conditions when the occupancy is relatively low and when the outside air is cold, it is expected that some heat will be necessary for comfort. This heat is obtained from one of two sources. Very low requirements are satisfied by an electric furnace that is expected to be able to supply the needs 75% of the time. When more heat is required, the heat demand automatically starts one of the standby generators with heat obtained from the generator's cooling system. And when demand drops to capacity of the electric furnace, the generator automatically shuts off.

Incorporated into the design is a complete system for the identification of personnel entering the unit. Electric eye units provide warning of entering personnel. And an industrial television set scans that portion of the entrance way which leads to the interior front door. Before the interior front door can be reached, some 12 ft have to be traversed in full view of the camera. And provision is made for holding an identification card to a frame that focuses it in front of a special lens of the camera. The viewing of the television camera is at two points inside the building, at the receptionist's desk and at the police dispatch desk. Either one of these two stations can then, upon being satisfied by the identification, press a button which releases the electric catch at the interior front door.

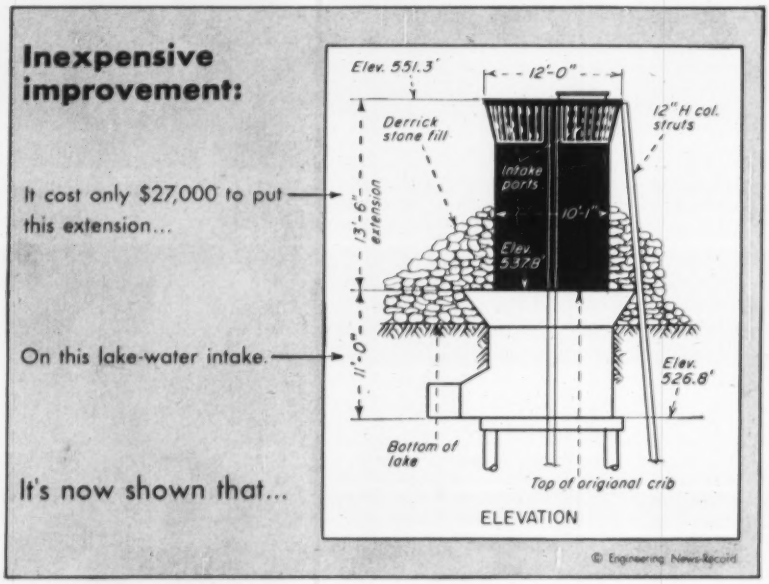
• **Emergency power**—The electrical system incorporated in this structure is believed to be one of the most complete that has yet been developed in this country for this use. It includes standby generators that come on automatically if and when outside power sources should fail. And as the standby generators are going to be available anyway, the diesel units automatically go in service when the interior load on the electric supply system exceeds 90 kw. This means that, under ordinary operating conditions on a day-to-day basis, when occupancy, as well as the heat and ventilation load is very light, the outside source of power will serve the needs. But, under crash conditions or under any conditions where all lights and all ventilation units are in full service, the standby diesel units will be activated and the supply of electricity from outside will be cut off. When the inside load drops back down to below 90 kw the generators will turn off after 15 minutes and the outside electric source, if available, will again be utilized for the power.

Jack Lowe, director of Portland's Bureau of Disaster Relief and Civil Defense, is responsible for the development of the project for the city, under Mayor Fred L. Peterson. Design of the structure was accomplished by Edmundson, Kochendoerfer and Kennedy, architects and engineers, with R. Evan Kennedy in charge. Fritz Klawa was electrical engineer and Thomas E. Taylor was mechanical engineer. General contractor is A. V. Petersen Co. of Portland. Prefabricated arch formwork was designed, fabricated and erected by Timber Structures, Inc., of Portland, Ore.

Free Traffic Advice Planned For Tenn. Cities and Towns

The 1957 Tennessee legislature will be asked to set up a traffic engineering service to provide traffic and safety information to Tennessee cities and towns.

Herbert Bingham, executive secretary of the state municipal league, said the engineering service probably would be set up under the state department of highways. It will provide all cities and towns with expert information and advice on street and highway problems, with no cost to the municipalities.



Extended Intake Improves City's Water

Benton Harbor, Mich., has been one of those Lake Michigan cities plagued at times with a water supply with heavy algae concentrations—meaning uncomfortably low filter runs in its water treatment plant.

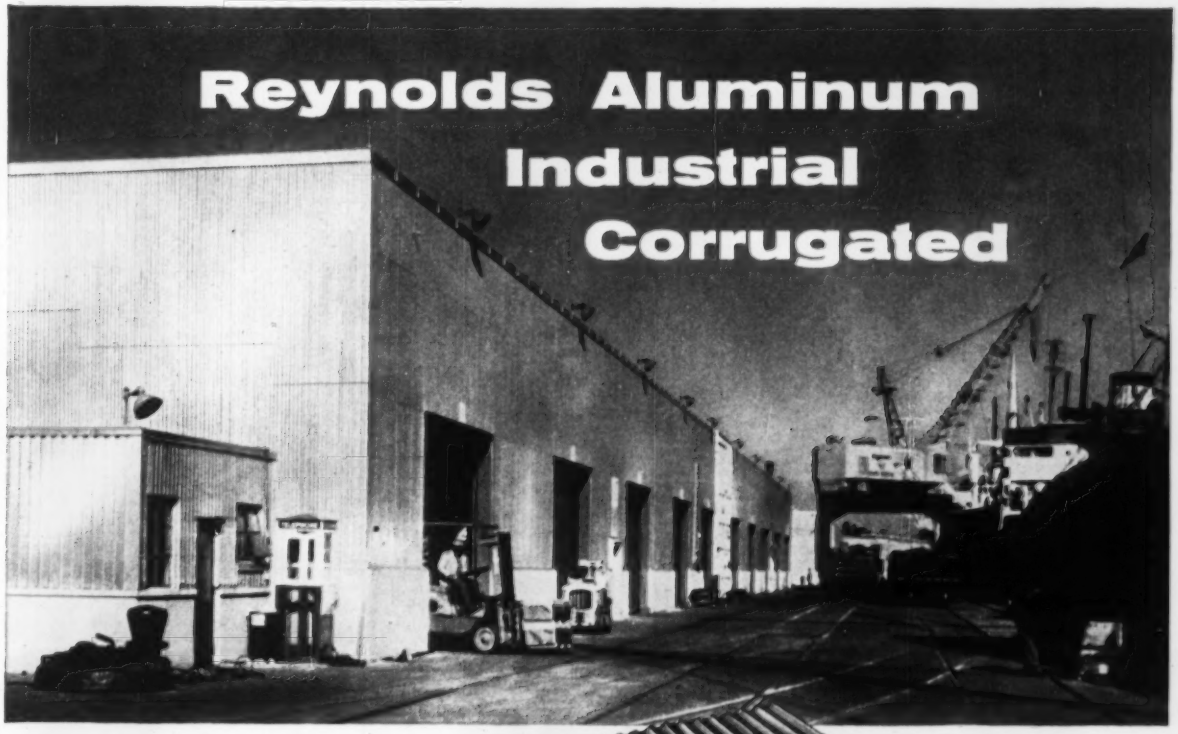
Whenever strong northwest or southwest winds stirred up the lake, the city had trouble clarifying its water. An intake built in 1951 was situated in a spot near where the St. Joseph River discharges to the lake its burden of sewage and industrial wastes. The lake bottom at the spot was covered with a slimy, viscous, dark and semi-fluid deposit, which when stirred up by wind action and undertow made a raw water rather difficult to treat.

A redesign of the intake crib—changes costing but $27,000—has solved Benton Harbor's problem. The intake simply has been extended 13.5 ft further upward from the bottom. Filter runs have not dropped below 18 hours since the change was effected.

The experience at Benton Harbor points out the necessity of determining in advance of design just what raw water quality can be expected under conditions of heavy wave action and bad bottom conditions.

William J. Russell is superintendent of water and sewerage at Benton Harbor. Consultants who devised the needed change in the intake level were Consoer, Townsend and Associate, Chicago.

3-Year-Old Installation Speaks for Itself!



The Georgia Ports Authority, operating Savannah State Docks and Warehouses, is responsible for the 1953 installation of Reynolds .032" Industrial Corrugated on transit sheds like the one shown above. Not far from the ocean and in the smoke of river traffic, this siding has remained clean, bright, new-looking ... telling its own story of freedom from rust and resistance to corrosion. In this Southern climate, the high radiant heat reflectivity of aluminum (up to 95%) is an important advantage. Write for literature on this long-life, low-maintenance material...also widely used as roofing (Reynoroof).

A complete installation service is available. For name of nearest franchised jobber-erector, call the Reynolds office listed under "Building Materials" in classified phone books of principal cities. Or write to **Reynolds Metals Company,** Building Products Division, 2007 S. Ninth St., Louisville 1, Kentucky.

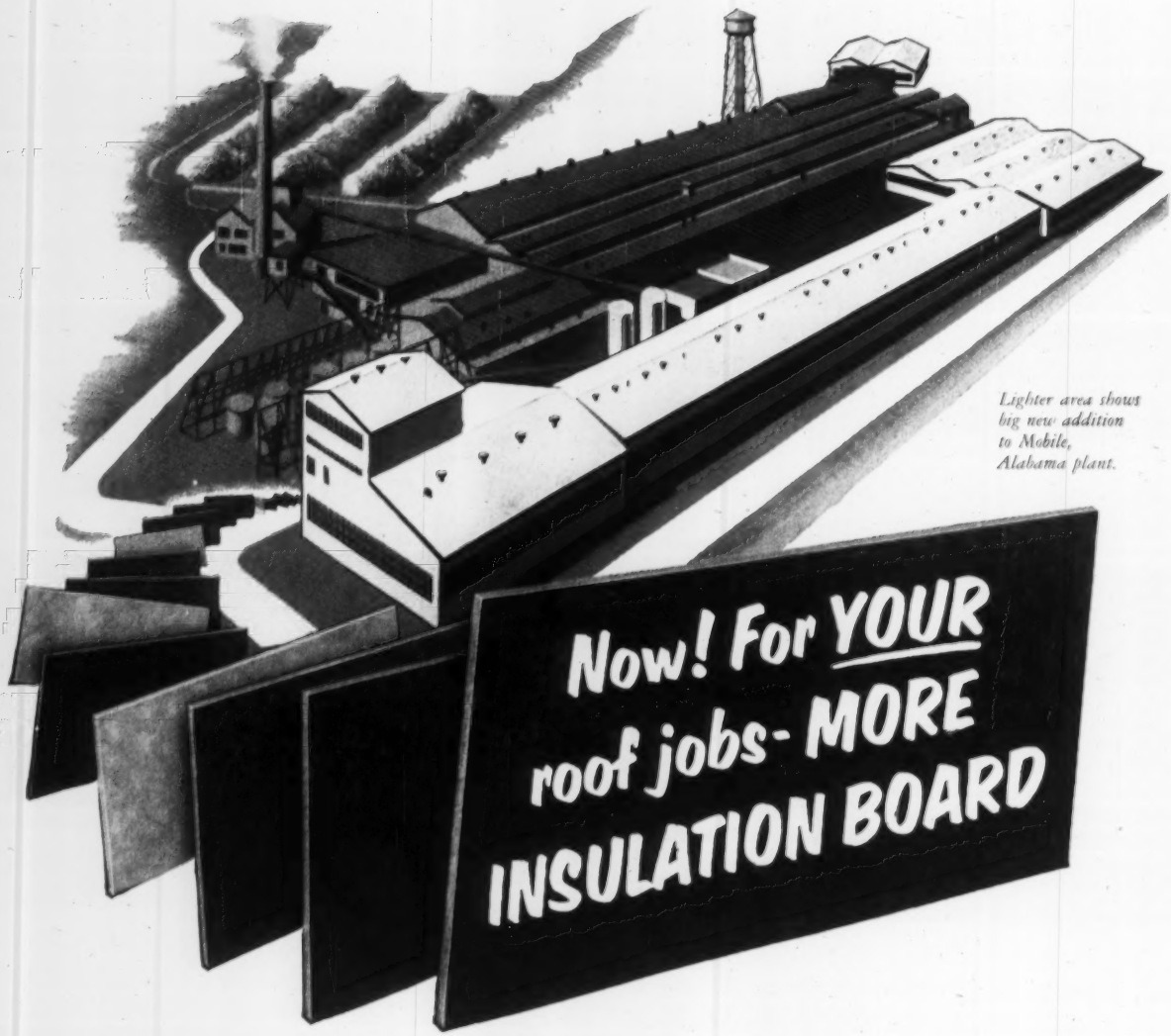
REYNOLDS ALUMINUM INDUSTRIAL CORRUGATED

Specifications:

Thickness: .032"
Widths: 48½" and 35"; nominal coverage 45" and 32"
Finishes: Embossed or mill finish.
Corrugation: 2.67" center to center; ⅞" depth.
Weight: 56 lbs. per 100 sq. ft. of formed sheet.

REYNOLDS ALUMINUM
BUILDING PRODUCTS

See "FRONTIER," Reynolds great dramatic series, Sundays, NBC-TV Network.



Lighter area shows big new addition to Mobile, Alabama plant.

National Gypsum's huge plant addition at Mobile helps ease shortage!

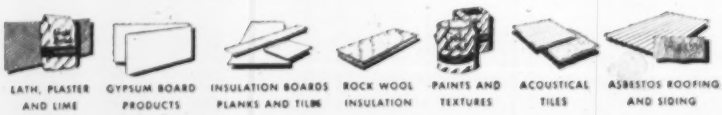
Here's National Gypsum's answer to the increased demand for roof insulation board . . . a huge plant expansion at Mobile, Alabama. This big new addition is already producing more of much-wanted Gold Bond Insulation Board — National's contribution toward easing the shortage.

The Mobile plant is located deep in the Southern pine region, assuring a steady supply of raw materials. The new unit adds a huge 600-foot-long board machine, operating at high speed under close quality control. Gold Bond Roof Insulation Board comes in ½", 1", 1½" and 2" thicknesses . . . in natural or asphalt-coated finish.

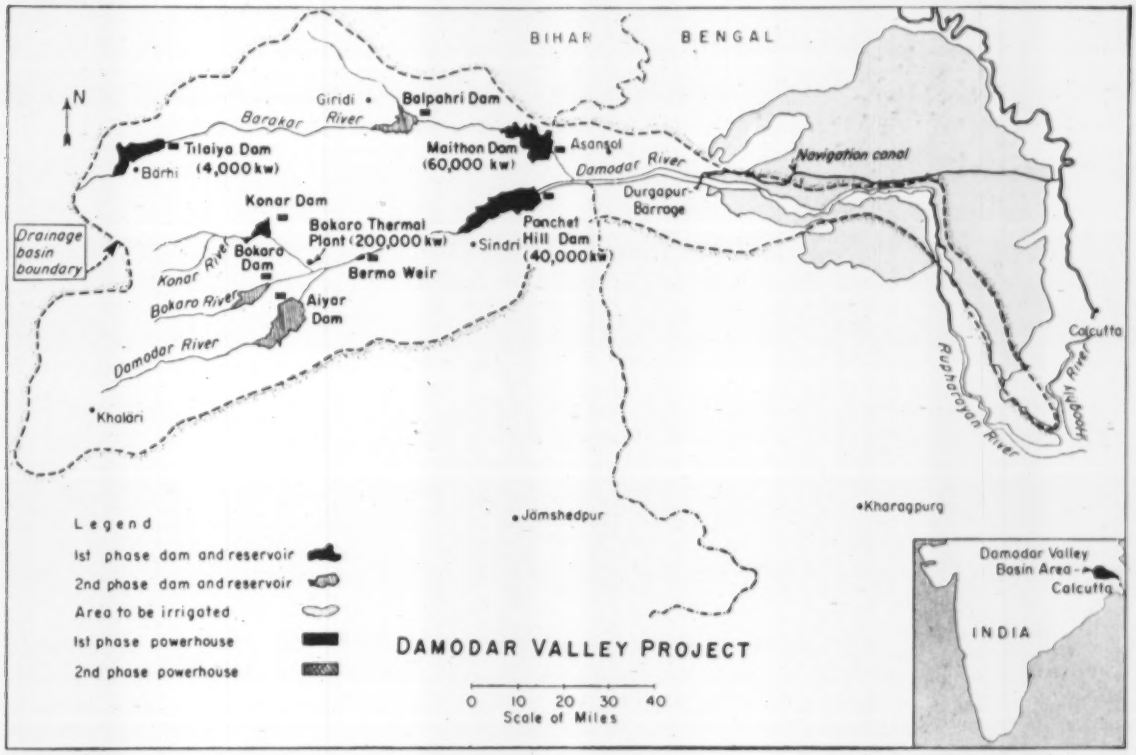
On your next roof job, take advantage of the increased supply of Gold Bond Roof Insulation Board . . . specify Gold Bond. For technical data or other assistance, call your Gold Bond representative or write to:

NATIONAL GYPSUM COMPANY • BUFFALO 2, NEW YORK

Build better with Gold Bond



. . ROOF INSULATION BOARD



After eight years of construction . . .

A Progress Report on India's TVA

Now in its eighth year of construction, the Damodar Valley Corporation—commonly known as India's TVA—has thus far invested $150 million in a complex of dams, power plants and irrigation structures stretching over a 330-mi-long valley terminating at the port city of Calcutta. Although behind schedule by some five years, DVC work already has had striking impact on the basin's industrial and agricultural development — not so much through actual power delivered or acres irrigated, but as a stimulus for growth affecting industrialists and peasants alike.

Most of the new construction has been accomplished in the past five years, since ENR's last major article on the subject (ENR, May 24, 1951, p. 33). At that time steel was being erected at the 200,000-kw Bokaro steam plant and construction was under way at Konar and Tilaiya dams.

At 1955's close, DVC had completed these two dams, plus a powerhouse at Tilaiya, the Durgapur Barrage and headworks, and the Bokaro thermal plant except for installation of the final 50,000-kw generator. Under construction are Maithon and Panchet Hill dams and the canal system to be controlled by Durgapur Barrage.

• **First phase aims**—When these are completed—probably by 1958—the first phase of the valley project will have been attained for an estimated $202 million. By then, hydro and steam electric power generating capacity will total 300,000 kw, 1,800,000 acre-ft of water will be impounded, more than 1,000,000 acres of farmland will be irrigated through 1,500 mi of main and branch canals, 800 mi of high voltage transmission lines will have been strung, and perhaps most important, 992,000 acres of land will be protected against floods.

The second phase—for which no completion date has been set—will include hydroelectric dams at Aiyar, Bokaro and Balpahri, a weir at Bermo and power facilities at Konar Dam. When these dams are completed, 5,000,000 acre-ft of reservoir capacity will be available for flood protection on the Damodar River.

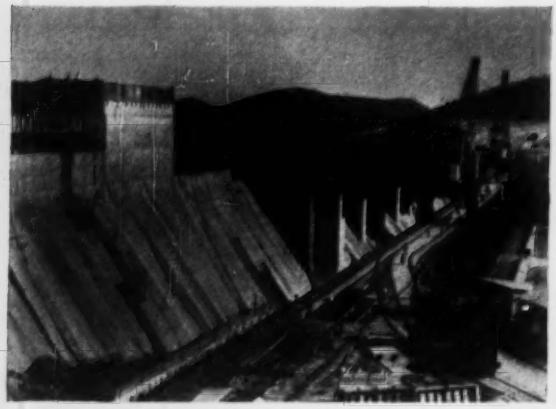
• **Facilities description**—Bokaro thermal station, completed in February 1953 at a cost of $32 million, has three 50,000-kw generators powered by steam at 850 psi from 300,000-lb-per-hr boilers of typical U. S. design. A fourth unit is to be added by 1958.

Tilaiya Dam and powerhouse were completed in early 1953. The dam is a 112-ft-high concrete gravity structure, 1,150 ft long and impounds 300,000 acre-ft of water. Capacity is 4,000 kw, cost was $6.3 million.

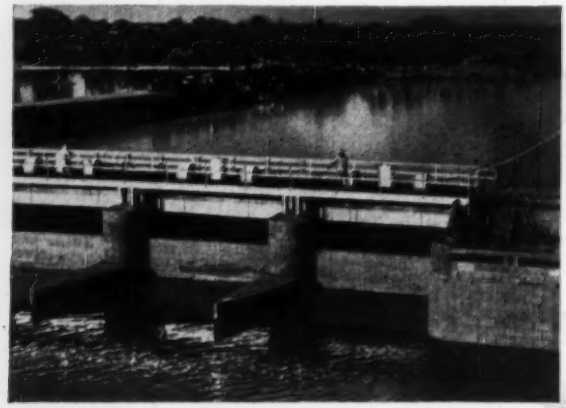
Konar Dam, completed in 1954, is an earthfill structure 12,760 ft long and 160 ft high, including a 900-ft long concrete spillway; 290,000 acre-ft of water can be impounded in its 10-sq-mi reservoir.

A total of 1,564 mi of main and branch irrigation canals, to work with 2,270-ft Durgapur Barrage, is under construction. A final facility here is an 80-mi navigation canal to join Hooghly River north of Calcutta.

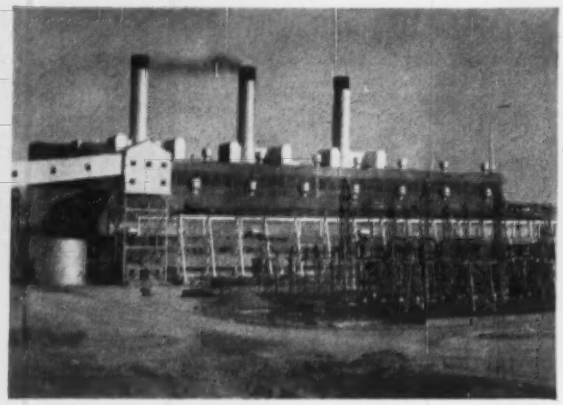
(Continued on page 54)



MAITHON DAM, rising 162 ft, is nearing completion.



DURGAPUR BARRAGE controls water over 2,200-sq mi area.



BOKARO THERMAL STATION is now producing 150,000 kw.

PANCHET HILL DAM is largest and last structure of first phase.

An almost exclusively Indian engineering and construction force is putting the finishing touches on Maithon Dam and powerhouse where the Indians hope to generate 60,000 kw by November. The earthfill dam is 162 ft high, 12,500 ft long, and will back up water in a 41-sq mi lake.

The largest single feature of the DVC undertaking is Panchet Hill Dam. Also an earthfill structure, it is 133 ft high and 16,870 ft long and will store 2,00,000 acre-ft of water in a 35-sq mi reservoir. This water will power 40,000 kw worth of generators.

• **Industry in upper valley**—Like the Tennessee Valley Authority, the greatest impact of DVC is on industrial growth. The upper portion of the 330-mi Damodar valley contains all of India's copper and kayanite reserves, 98% of its iron ore, 80% of its coal, 70% of its mica and chromite deposits, and over half of the country's fire clay and china clay fields. Factories, utilizing DVC power, are already producing iron and steel, locomotives, trucks, copper, cement and a host of chemicals. Plans have been proposed for new industries, such as fisheries, ceramics, cold storage plants, and metalworking, as well as for expansion of existing plants.

The chemicals industry is leading the expansion parade. One such plant —a chemical fertilizer factory at Sindri—is of direct interest to construction men. The fertilizer produced here is ammonium sulphate which generates huge quantities of calcium carbonate sludge wastes. In 1955 a portland cement factory began production at Sindri utilizing the waste sludge as its principal raw material—thought to be the second factory in the world using this raw material.

The calcium carbonate sludge is pumped in the form of a slurry containing 80% water directly to the cement plant. Here a Dorr-Oliver thickener reduces water content to about 40%. The sludge is then pumped into various silos where correcting ingredients such as clay are added. A large mixer thoroughly blends and agitates the corrected slurry to effect complete homogenization before feeding it into rotary kilns. Remaining operations are standard.

The plant is designed for production of 200,000 tons of portland cement annually, although actual production is geared to the fertilizer factory's output of sludge.

• **Lower basin agricultural**—Lower Damodar valley is flat, alluvial, extremely fertile land devoted mainly to jute growing and rice paddies. Only one crop a year is harvested now—often none because of floods—but two crops will soon be possible.

In 1943 one of the worst floods in India's history struck the Damodar valley, devastating thousands of acres of cultivated land and uprooting millions of people. In its wake came malaria and famine. Now, 13 years later, the once unruly river is beginning to flow quietly into man-made lakes and canals.

Consultants and contractors from the United States, Great Britain, Switzerland and France played significant roles in this accomplishment. (*International continued on page 56*)

WELLPOINTS LOWER WATER TO ROCK BOTTOM IN ARKANSAS RIVER SAND

PROJECT: Construction of two concrete conduits, 36" wide, 1900' long, under the Arkansas River, to serve Tulsa, Oklahoma's new sewage disposal plant.

The BIG PROBLEM on this deep excavation was WATER—14' of it in sand and gravel overlying shale rock.

It was SIMPLY SOLVED by installing a Moretrench Wellpoint System which pulled the water down to shale with these immediate results:

Excavation was handled quickly—in the dry.

Rapid job progress, essential during low river stage, was assured.

Sheeting was completely eliminated. Banks sloped.

Time and money were saved.

Need help on your wet job? Call us! We'll be glad to talk it over.

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THE LATEST

VINYL PLASTIC WATERSTOP

for "wall-floor" and "between-pour" horizontal concrete construction joints

Water just can't get through joints protected by FLEXTRIP, the all-new, strip-type waterstop. Unique concave shape plus ribbed edges give FLEXTRIP a never ending grip in the concrete . . . is flexible enough to withstand extreme joint-separation (more than 3 inches) yet rigid enough to stand up to the battering effect of pouring concrete. Here's lasting joint-protection unmatched by any other waterstop. What's more, FLEXTRIP will never rust, rot, check or crack and is unaffected by acid, alkalies, petroleum products, chemicals or the most adverse atmospheric conditions . . . lasts as long as the concrete. Write for additional information on FLEXTRIP and other vinyl waterstops. Send coupon below.

Made by the makers of LABYRINTH WATERSTOPS . . . the standard waterseal on outstanding construction jobs everywhere — eliminates seepage problems . . . simplifies form work.

Made in Canada for J. E. Goodman, Sales Ltd. Toronto, Ontario

WATER SEALS, INC.
9 South Clinton • Dept. 4, Chicago 6, Illinois

Without obligation, please send me information on your new FLEXTRIP and LABYRINTH WATERSTOPS.

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SPOKESMAN FOR USA—Thomas P. Browne, director and now vice-president of AIDIS, brings greetings of U. S. section to meeting in Lima, Peru.

Sanitary Engineering Congress Shows Latin American Advances

AIDIS, the Inter-American Association of Sanitary Engineering, wound up its Fifth Inter-American Congress in Lima, Peru, about 2 AM March 26. It had had a full and busy week.

As delegates from throughout the hemisphere convened to exchange ideas in the field of sanitary engineering, it became evident to the U.S. observer that two very encouraging trends were showing strength in Latin American countries:

- Capable practitioners, solidly founded in theoretical matters, show an increasing appreciation of the practical in their sanitary engineering.
- Lively interest is being shown in improved financing methods—methods that should mean more construction of needed sanitary facilities.

The congress resolved to continue work on a partially completed Spanish-English-Portugese sanitary engineering dictionary, and to seek improvement in sanitation of travel facilities. And delegates to the congress discussed and heard discussed a broad range of subjects: Modern filtration techniques, fluoridation, water pollution control regulations, rural water supplies, sewage works construction, engineering education, and the financing of public works were but a few.

Brazil's Jose M. Azevedo N. opened discussion of water filtration rates by advocating a fast 5 to 6 gpm per sq ft. Discussors stressed the need for higher efficiency of pretreatment to aid this increased filter capacity and urged plant design that will permit capacity to be increased.

Public works financing drew more attention than at previous congresses of AIDIS. One speaker called for courage tempered by economic reality in the imposition of user charges for water and sewage services. Many bases for rate structures were discussed.

Equipment exhibits attracting great attention during the meeting included names and products of U.S. manufacturers—Armco, Fisher & Porter, Neptune Meter, Permutit, Simplex and Wallace & Tiernan.

Puerto Rico's delegation went home with a mission accomplished. The VI Congress will be in San Juan in 1958.

Officers elected at the Lima meeting include: Rafael Urrutia (Puerto Rico), president; Thomas P. Browne (USA) vice-president; Enrique Ortega (Puerto Rico), general secretary.

Gas-Turbine Power Unit Set for Vancouver Island

British Columbia Power Commission has confirmed it will build a 75,000-kw, gas-turbine power unit on Vancouver Island at a cost of $13-$15 million.

The new plant will be the second largest in the commission's province-wide system, surpassed in capacity only by 126,000-kw John Hart hydro development on Campbell River.

No date has been set for start of

PROLONGED CONFINEMENT COUNTS

...when it comes to blasting efficiency

Preparing for "coyote" shot. Tunnel dug 50 ft. into hillside . . . then right-angled 25 ft. off trunk in either direction. Atlas explosives loaded at ends of "T" crossbar. Back-filled. Ready to fire electrically.

Prolonged confinement of blast keeps 8250 lbs. of explosives hard at work underground. Little wasted energy. Explosives force disintegrates hillside. Good displacement. Excellent fragmentation.

Huge, workable final pile: 25,000 yds. of well-crushed rock . . . broken into small fragments. Here's peak blasting efficiency . . . easy work for the shovel. It's the prolonged confinement that counts!

PROLONGED CONFINEMENT—the Rockmaster® way

How's this for breakage! For explosives efficiency! Here's a blast that really paid off—in good displacement . . . in quick, easy, economical removal.

When it comes to getting the most out of your explosives, it's *prolonged confinement* that counts! In this "coyote" shot, Roseburg Lumber Co., Roseburg, Ore., loaded 7750 lbs. of Atlas Flodyn and 500 lbs. of Atlas 40% Gelatin well inside the hill. Explosives force was confined to the burden . . . instead of blasting the air. The right combination of ROCKMASTER electric blasting caps and Atlas explosives shows—

- **good control**
- **improved breakage**
- **greater efficiency**
- **better public relations**

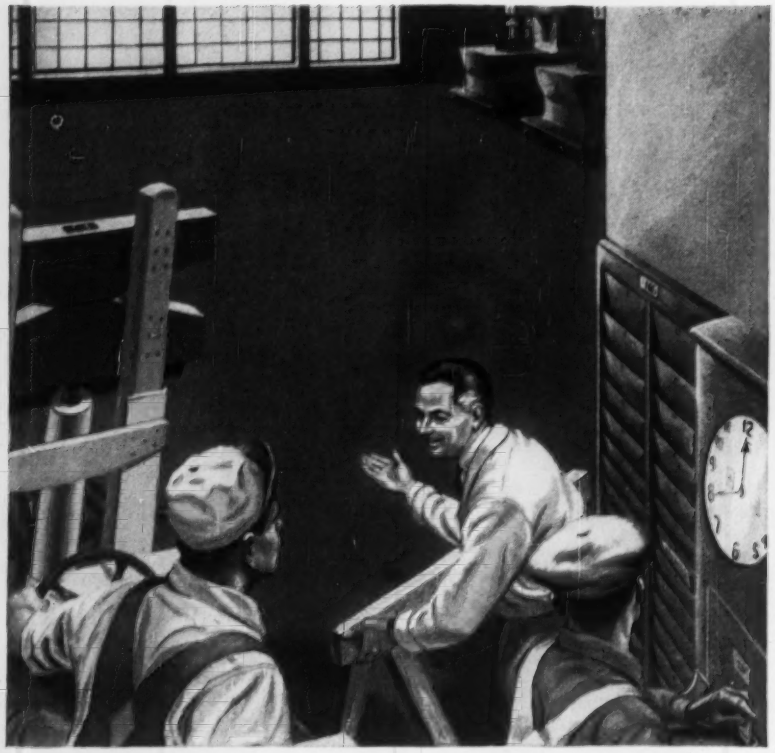
Before your next blast, why not go over your specific blasting problems with your Atlas representative? He has ideas and experience you can put to use . . . and profit from. And get "Better Blasting"—Atlas' informative newsletter on latest methods and materials. Write us to put your name on our mailing list today.

EXPLOSIVES DEPARTMENT

ATLAS POWDER COMPANY

WILMINGTON 99, DELAWARE

offices in principal cities



Almost *Overnight*...get flooring that's durable...comfortable...tough ...with FLINTMASTIC!

Resurface your worn work floors. Fast.

In a matter of hours... plant traffic will be moving quickly, smoothly, over an efficient Flintmastic† cold-laid asphalt mastic floor! You'll have an entirely *new* wearing surface.

If you just want to *repair* holes or smooth over damaged areas... Flintmastic, which is asphalt mastic made with famous Flintkote Flooring Emulsions, does *these* jobs quickly and economically, too.

Want to lay down a resilient leveling course as underlayment for decorative floor coverings? Flintmastic fills the bill again.

Remember this about Flintmastic. It is made with Flintkote *clay-type* asphalt flooring emulsion. Flintmastic floors carry the heaviest traffic without rutting or cracking. And these floors are quiet. Comfortable under foot. Shock-absorbing. Non-slip. Water-resistant. Fire-resistant.

Flintmastic specification mixes can be applied over new or old floors. In thin or thick section.

We will be glad to send you complete information and specifications for installation.

† A Trade Mark of The Flintkote Company

FLINTKOTE

THE FLINTKOTE COMPANY, *Industrial Products Division*, 30 Rockefeller Plaza, New York 20, N. Y.

BOSTON • CHICAGO HEIGHTS • DETROIT • LOS ANGELES • NEW ORLEANS • PHILADELPHIA

In Toronto, Ontario: The Flintkote Company of Canada, Ltd.
In London, England: Industrial Asphalts Company, Ltd.

. . . International

Long Load

Extending for 284 ft over a series of flatcars, this three-span continuous welded girder bridge was transported six miles from fabricating shop to site. It was one of three identical bridges set in place in the same manner on the lines of the German Railways in the Ruhr, with a minimum interruption to traffic. Each bridge weighed 170 tons and was 14.5 ft wide.

construction, but the plant will be at least partly operative in 1957. The site is expected to be the central section of the east coast of the island.

Consulting engineers for the commission on the project are P. R. Sandwell & Co., Vancouver.

Two Americans Plan Study Of Once-Great Iran Region

Two of America's foremost river basin developers, David Lilienthal and Gordon Clapp, have agreed to organize an extensive study of the resources of a 2,500-year-old region in the once-flourishing Persian Empire of pre-Christian days.

Lying in southwest Iran and encompassing the Abadan oil refineries, the area is known as the Khuzistan region. It once contained many dams and irrigation canals along two main rivers, Karun and Karkheh, and produced sufficient grain to sustain a purported 10,000,000 inhabitants. Now Khuzistan is almost a desert and houses perhaps 500,000 people.

In a preliminary report to Iranian officials, the Americans, now heading Development and Resources Corp., saw an ideal combination for extensive development in royalties from Iranian oil and fuel for power from the byproduct natural gas.

Wire rope lasts as long as the wire it's made of!

ROEBLING'S NEW ROPE WIRE

1105

HAS THE CAPACITY TO ENDURE...
AND

Royal Blue

WIRE ROPE
IS MADE OF 1105!

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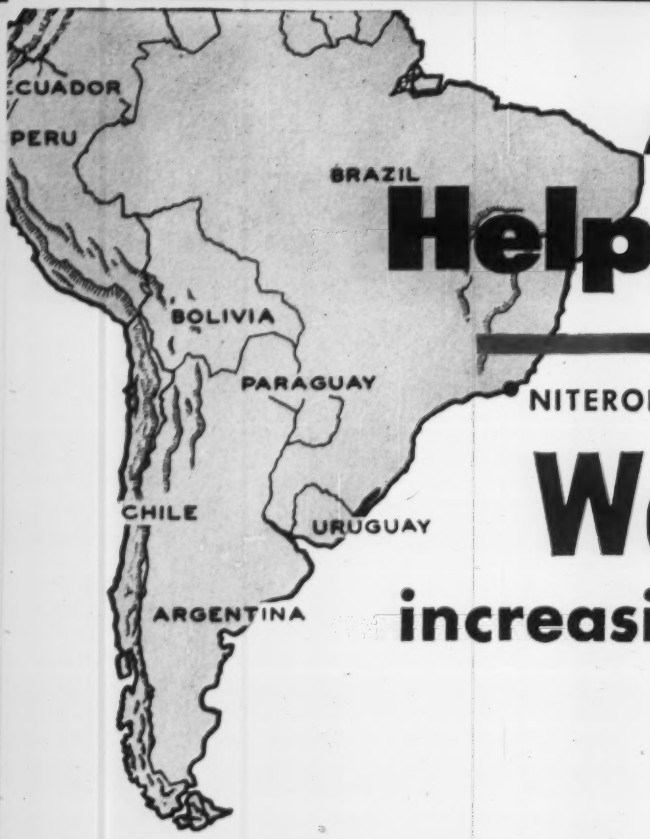


Allis-Chalmers Helps Increase Water to meet increasing needs of Niteroi, Brazil

Across the bay from Rio de Janeiro, the busy waterfront city of Niteroi and its suburban areas needed more and better water to meet growing industrial and metropolitan requirements.

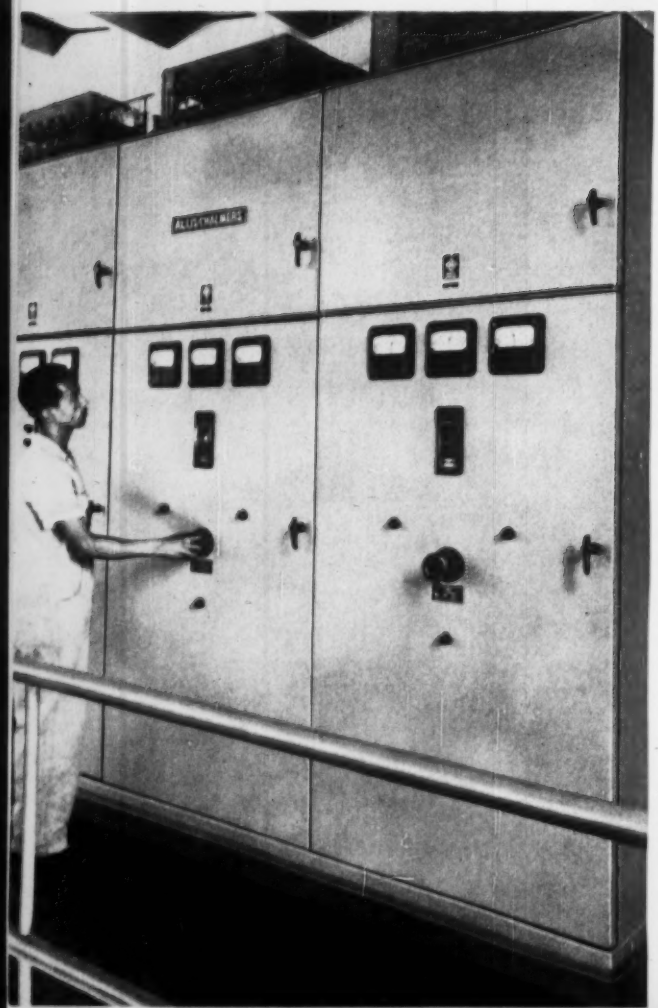
Untreated water was furnished from protected reservoirs — top capacity was 4500 gpm for almost 300,000 population.

Because of this, a new water system was installed, including a complete treatment plant and reservoir, with a direct-fall supply to the city in potential capacity of 16,000 gpm — an increase of over 250%. At present the system is putting out 9500 gpm, at an average 100 lb pressure, pending improvements in city mains and sewer system.

Two pumping stations supply Niteroi: Imunana, a new site on the river; and Laranjal, handling water from the mountains. Allis-Chalmers pumps, motors and control, installed and operating at both stations, furnish the greatly increased amount of water needed to meet the requirements of the new water system.

When YOUR CITY plans expansion or modernization, do as progressive communities all over the world are doing — call your nearest A-C office or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

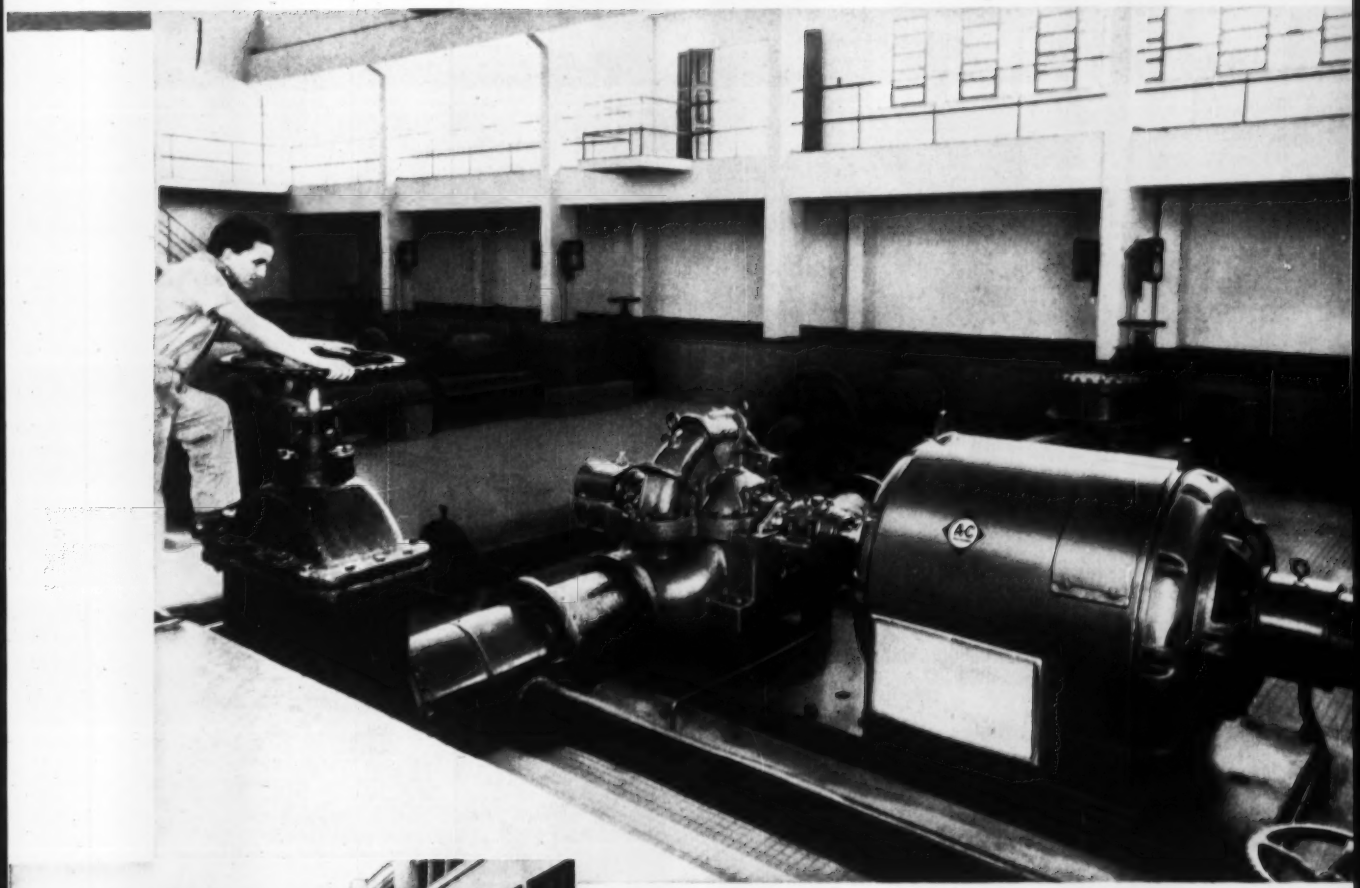
A-4951



Allis-Chalmers control lineup at Laranjal Station features three Type HARS-70 starters, used with synchronous motors. Starters at Imunana Station are identical, used with Allis-Chalmers 500-hp end-shield bearing synchronous motors.

ALLIS-

Equipment
Water Supply 250%



Three Allis-Chalmers 16 by 14-inch Type SI pumps, rated 7926 gpm, 295-ft head, are driven at 1200 rpm by Allis-Chalmers 800-hp end-shield bearing synchronous motors with new drip-proof construction. Laranjal Station is pictured — equipment installed at Imunana is similar.

Exterior view of Laranjal Station of the Niteroi water works. This contemporary building contains pumping station and operation offices. Modern housing units were built at each station to accommodate operating personnel and families.

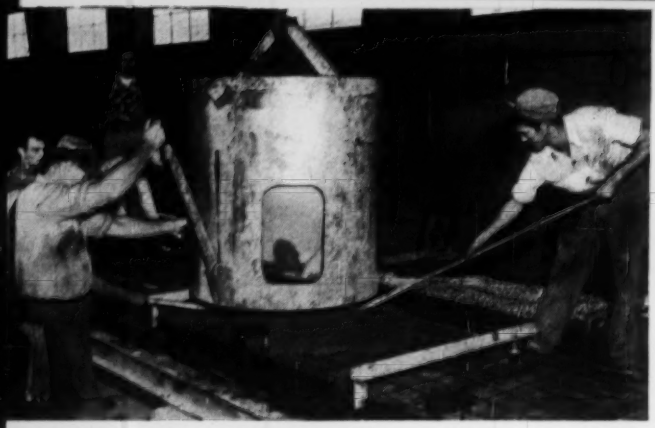
Allis-Chalmers Builds the World's Largest Range of Equipment for Public Works

Pumps; motors, *Texrope* drives, control; switchgear, substations, transformers; butterfly valves; steam turbine-generator units, condensers, hydraulic turbines and generators, engine-generator units; blowers, compressors, vacuum pumps; dryers, screens, mills, sifters; tractors, graders, scrapers, motor wagons, power units.

Texrope is an Allis-Chalmers trademark.

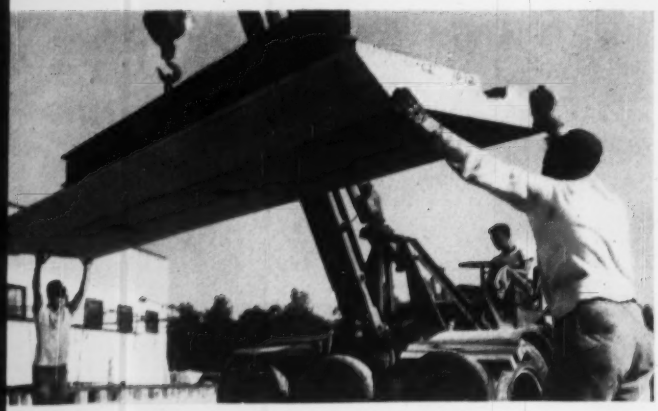
CHALMERS

A-C ALLIS-CHALMERS

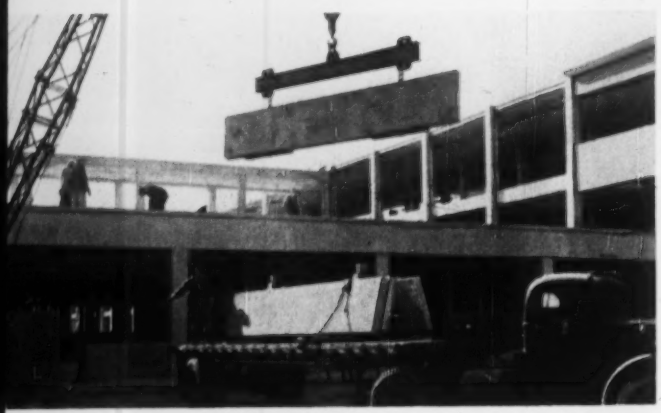


▲ Placing concrete made with Lehigh Early Strength Cement for one of the 1100 precast insulated wall panels required for this job. All panels were cast at Marietta Concrete Corp. plant.

▲ Removing panel from form just one day after being poured . . . ½ the usual time. Wall panels vary in size from 2′ 2″ x 2′ 3″ to 18′ 5″ x 6′ 6″.



▲ In addition to the wall panels, the job required 260 pieces of precast coping . . . also made with Lehigh Early Strength Cement. The average piece is 3′ wide x 18′ long x 12″ thick.



▲ Wall panels being erected at job site. An exposed aggregate finish was placed on the surface for architectural effect after panels were removed from forms.

PRECAST CONCRETE PANELS

made with

Lehigh Early Strength Cement

FOR WORLD'S LARGEST BUILDING OF CONCRETE PANEL CONSTRUCTION

The use of Lehigh Early Strength Cement in the precast wall panels and coping for the National Security Administration Building at Fort Meade, Md., permitted form removal in ⅓ the usual time—cut form costs by ⅔. This, the world's largest building of concrete panel construction, offers further proof that somewhere on nearly every job Lehigh Early Strength Cement will save time and money.

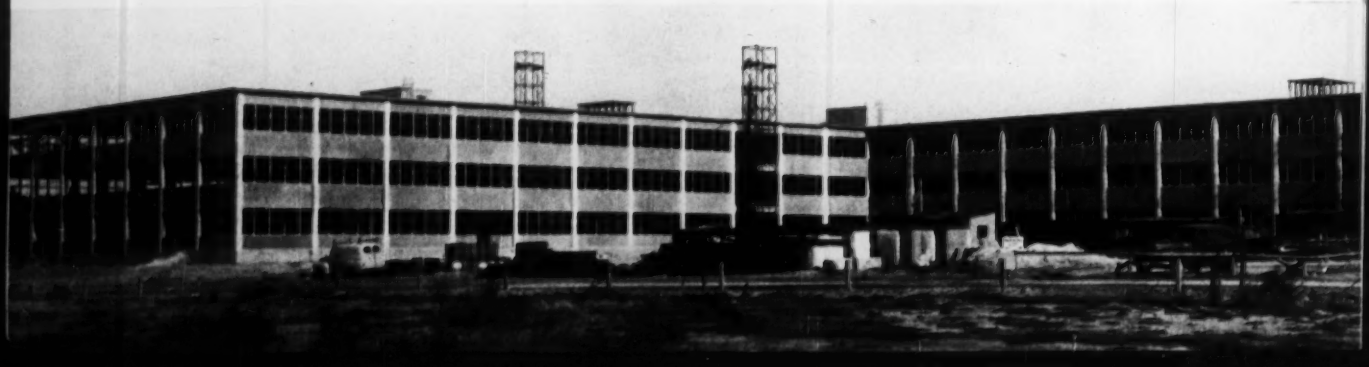
Manufacturer of precast insulated panels—Marietta Concrete Corp., Rossville, Md.; General Contractor—a joint venture consisting of Chas. H. Tompkins Co., Washington, D.C. and J. A. Jones Construction Co., Charlotte, N. C.; Ready Mix Concrete for panels supplied by Harry T. Campbell Sons Corp., Towson, Md.; Supervision by U.S. Army Corps of Engineers.

LEHIGH PORTLAND CEMENT COMPANY

Allentown, Pa.

- **Lehigh Early Strength Cement**
- **Lehigh Portland Cement**
- **Lehigh Air-Entraining Cement**
- **Lehigh Mortar Cement**

Two wings of building, showing panels and coping in place. It contains 1,400,000 sq. ft. of floor space and is the largest building of precast insulated panel construction in the world. ▼



Cost-Plus Contract Allows Inclusion of Work by Subs

Under a cost-plus 10% contract for construction of buildings, a federal court allowed a contractor to recover 10% of the cost of construction, including that done by subcontractors.

The contract before the court was for construction of a theater, a drug store and three store buildings.

A dispute arose as to the items that could be included as items of cost. The owner wanted to exclude the cost of plastering, electrical wiring, the marquee, the motion picture screen and window glass, which had been handled by subcontract. The court concluded these were part of the buildings and found in favor of the contractor[1].

In support of its conclusion, the court quoted from another case[2] which had defined "building" as follows: "The more restricted meaning of the word building as ordinarily used and understood is a structure enclosing space within walls and roof. Small v. Parkway Auto Supplies, 258 Mass. 30, 154 N.E. 521, 49 A.L.R. 1361; Nowell v. Boston Academy of Notre Dame, 130 Mass. 209. However, in its broadcast sense it may include any character of structure according to the connection in which it is used and the purpose sought to be effected by its use."

The court also cited the following authorities controlling the contractor's right to the 10% on work done by subcontractors: Grafton Hotel v. Walsh, 228 F. 5; Bushnell v. Brand, 199 Ill. App. 542; Hamilton v. Coogan, 7 Misc. 677, 28 N.Y.S. 21, affirmed without opinion, 148 N.Y. 753, 43 N.E. 987; Washington Construction Company v. Spinella, 8 N.J. 212, 84 A. 2d 617, 28 A.L.R. 2d 863. Reference is also made to the case of Winston & Co. v. Clark County Construction Co., 186 Ky. 743, 217 S.W. 1027 to sustain the conclusion that wages paid for a working supervisor was a proper element of cost in such contract.

(1) Churchill v. Anderson, 128 F. Supp. 425.
(2) Netter v. Scholtz, 282 Ky. 493, 138 S.W. 2d 951, 953.

Supervision and Equipment Ruled Not Elements of Cost

Charges for supervision and use of equipment have been disallowed as elements of cost in a subcontractor's suit to recover the difference between cost and the contract price.

The contract clause on which the action was based provided that "if the cost of the job exceeds the total price agreed on, the difference will be adjusted by the general contractor." Here the subcontract price was $20,000; the cost of the work, $36,167.88.

Because the court considered the language of the contract ambiguous, it looked behind the contract to see what the parties intended. Evidence received as to the contract negotiations led the court to conclude that it was the intention of the general contractor to pay the subcontractor the difference between $20,000 and the actual cost of the work and materials for performance of the contract.

The court granted the subcontractor a recovery, but did not allow as items of cost charges for supervision and the use of equipment[1].

According to the appellate court, "Supervision is ordinarily compensated for out of profit and is not a specific item of cost. The same is true of equipment used in doing the work. The contract did not contemplate, if the cost exceeded $20,000, that Roberts (the subcontractor) would make a profit, but rather that he would be compensated for actual loss."

(1) Lee E. Morris, Inc. v. United States, 219 F. 2d 541, U. S. Court of Appeals, Feb. 1955.

Certificate of Completion May Be Waived by Owner

If a construction contract requires the issuance of a certificate of completion before final payment can be sought, the contractor ordinarily is denied recovery until the certificate is issued. But if the owner takes possession and moves in, this condition may be waived.

In an Ohio case, a contract for construction of a house provided that the unpaid balance of the contract price would not become due and payable until the issuance of an approval certificate by the mortgage lender employed by the owner to finance the project. The contractor substantially completed the work but no approval certificate was issued even though the owner took possession of and occupied the building. The owner refused to pay the contractor who brought an action to recover the balance due. The action was dismissed but this judgment was reversed on appeal.[1]

The appellate court stated: "In the absence of fraud, bad faith, failure to exercise honest judgment, or a waiver on the part of the contractee, such a stipulation constitutes a condition

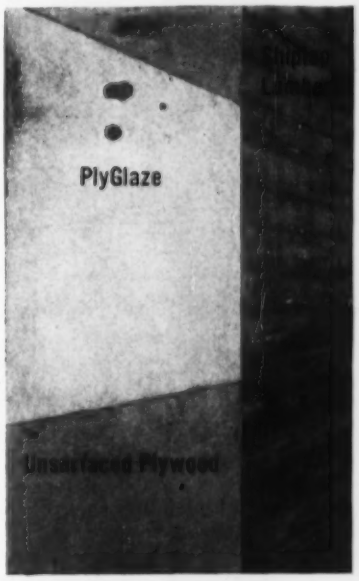


Photo taken right after stripping forms proves that you get the...

FINEST SURFACE with PLYGLAZE®
CONCRETE FORM PANELS

READ "finest" both ways: PlyGlaze *itself* has the finest, smoothest surface of any form material; PlyGlaze-formed *concrete* surfaces are the finest—smooth, even-textured, with no trace of grain pattern. Savings on finishing costs alone frequently offset slightly higher cost of this premium material. See Sweet's File or use coupon for more information.

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Another member of the famous Tree Life Family of Forest Products
Hard, glossy-smooth wear resistant fused resin-fiber surfaces.
Top-quality Exterior plywood (EXT-DFPA). Standard panel sizes.

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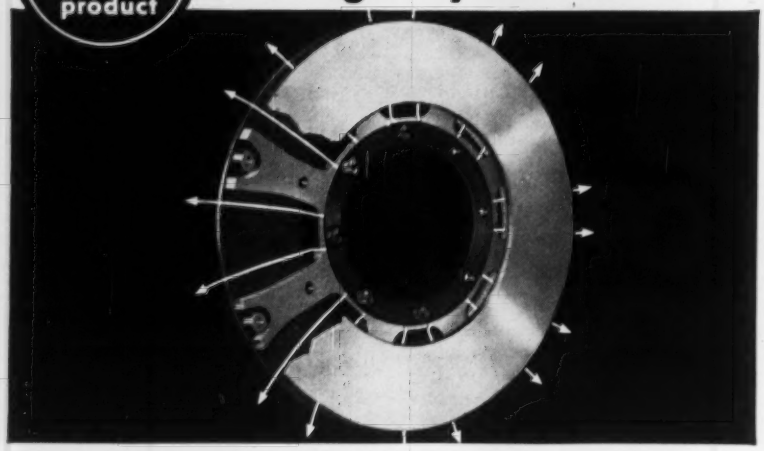
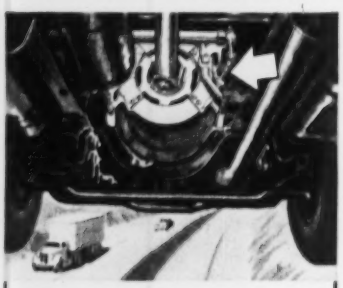


This Brake "Breathes"— and Linings Last Longer

• Terrific heat generated in braking cuts lining life—adds to maintenance costs. TRU-STOPS quickly dissipate this heat—make linings last longer.

That's why leading manufacturers of trucks, buses, tractors and special automotive equipment offer TRU-STOP Emergency Brakes as either standard or optional equipment.

When you specify TRU-STOPS for factory installation you get all these braking extras...



• Most of the disc is exposed to the air even during braking. A cooling jet of air circulates through the disc and prolongs lining life. Illustration shows drive shaft mounting.

Real Emergency Brakes
Serve as auxiliary brakes, assisting service brakes on down-grade if required. They will stop the vehicle, too.

Smooth, Positive Stops
Prevent accidents by insuring quick, positive stops.

Positive Parking Brakes
Hold vehicles safely on steep grades and prevent "parking brake" accidents.

Lower Service Requirements
Mounted directly on drive shaft, simplicity of design and easy accessibility reduce maintenance requirements. It is not necessary to drop drive shaft for either relining or adjustment.

For full details on TRU-STOPS, write for booklet

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TRU-STOP Emergency Brakes

precedent to the maintenance of an action to recover the sum claimed to be due under the contract."

The court also said: "However, where the owner of a building built for him under contract substantially performed accepts and takes possession of it, knowing or having reason to know that the construction is defective or incomplete, such acceptance will be deemed a waiver of such a condition precedent and the contractor will be entitled to recover the amount due under the contract less deductions for deficiencies. Ludlow Lumber Co. v. Kuhling, 119 Ky. 251, 83 S.W. 634, 115 Am. St. Rep. 254. See Brent v. Head, Westervelt & Co., 138 Iowa 146, 115 N.W. 1106, 16 L.R.A., N.S. 801."

(1) Creith Lumber, Inc. v. Cummins, 126 N.E. 2d 323, Supreme Court of Ohio, April 27, 1955.

Construction of Contracts

In determining the meaning of an indefinite or ambiguous contract, the interpretation placed upon the contract by the parties themselves may be considered by the court, and is entitled to great, if not controlling, influence in ascertaining their understanding of its terms.

An Ohio court, quoting in a recent case[1] from 12 American Jurisprudence, Contracts, Section 249 at page 789, stated: "It is to be assumed that parties to a contract know best what is meant by its terms and are the least likely to be mistaken as to its intention; that each party is alert to protect his own interest and to insist on his rights; and that whatever is done by the parties during the period of the performance of the contract is done under its terms as they understood and intended it should be."

"A cardinal principle governing the construction of contracts is that the entire contract must be considered and, as between possible interpretations of an ambiguous term, that will be chosen which best accords with the sense of the remainder of the contract." Where there is ambiguity in the terms of a contract, it is consistent with both reason and justice that any fair doubt as to the meaning of the words of the contract should be resolved against the party who prepared the contract.[2]

(1) Hoke v. Marcis, 127 N.E. 2d 54, Court of Appeals of Ohio, June 8, 1955.
(2) Rentways, Inc. v. O'Neill Milk & Cream Co., 126 N.E. 2d 271, N.Y. Court of Appeals, April 14, 1955.

(These summaries of court decisions are prepared by I. Vernon Werbin, New York attorney and civil engineer.)

NEW...

Bonus Powered too!

NEW..

124 Net Engine Horsepower. In International Drott Machines, Engine develops 134 Net Horsepower.

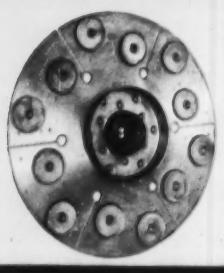
182 Series

TD 18

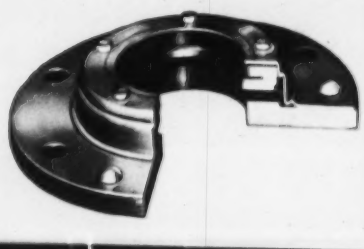
TD-18 diesel (series 182) delivers 103 drawbar horsepower, with weight of 29,050 pounds (without equipment). All-weather electric starting, standard equipment. "New look" visibility, operating ease never before available. New heavy-duty, swinging-door type radiator guard is "standard"—for carrying heavy front-mounted equipment. Gives big tractor performance in pioneering under roughest conditions. Powers 3-yard International Drott Skid-Shovel, anywhere.

No costly delay from a "killed" or cold engine—you start fast! Famous International gasoline-conversion diesel starting—actual "in-seat" starting—is standard equipment on this new crawler line. With "push-button" ease, you get seconds-fast starting, whether the engine is cold, or stopped! And you're on the job seconds-fast, when minutes are dollars.

Cerametallic Engine Clutch Facings Save power, defy heat, prolong life! Uncomplicated, *familiar-to-all* engine clutch design of these new crawlers have *power-holding, heat-defying, long-lasting* Cerametallic facings. These facings reduce lever-pull up to 50%, provide amazing heat immunity, add service freedom, cut upkeep!



Now . . . 500-hour lube intervals with new metal-to-metal, track roller seals! You save the time and expense of frequent inspections or lubrications, with the new *full-floating*, cartridge-type, track roller seals provided on the TD-24, TD-18, and TD-14. These precision-lapped, metal-to-metal seals are so effective they give you safe 500-hour intervals between roller lubrications!

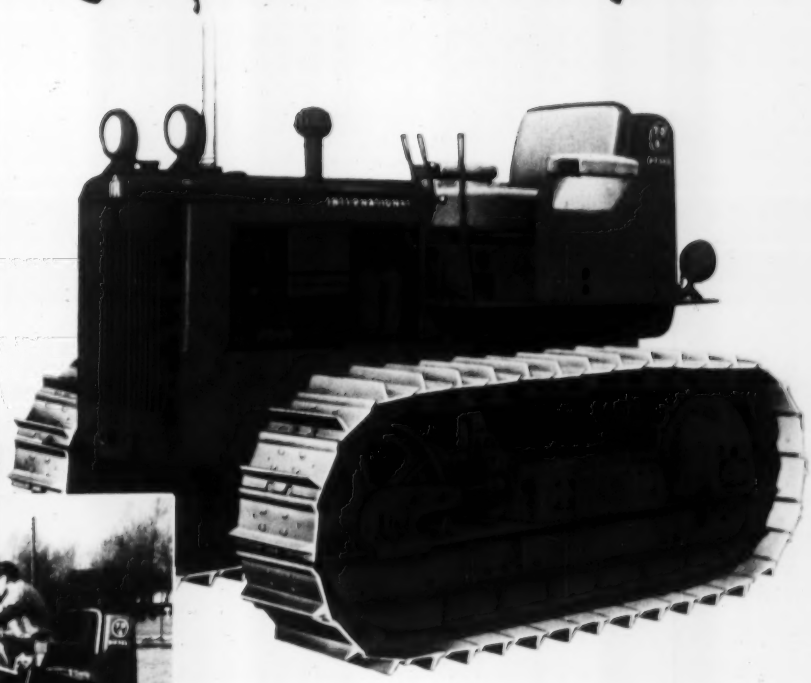


Steps up a size... in job range and capacity!

50 Net Engine Horsepower. In International Drott Machines, Engine develops 55 Net Horsepower.

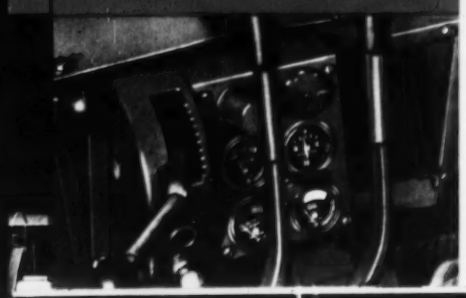
61 Series

TD 6



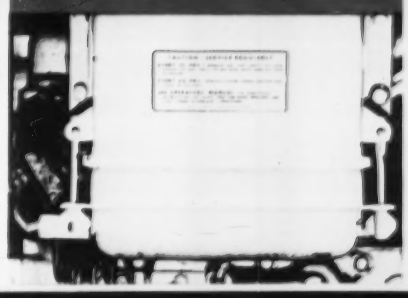
TD-6 diesel (series 61), 41.5 drawbar hp, up 23%! Steps up a whole size in work capacity and earning ability. Operating weight (5-roller model), without equipment, 8,890 pounds. Powers 1-yard International Drott Skid-Shovel or Four-In-One; serves as clean-up dozer unit on any-sized contract; versatility and low operating cost to do many sizes of jobs for every size of contractor.

Full-view, one-glance panel saves time—cuts effort! One quick glance at this new full-view panel, with centralized instrument grouping, gives the operator the instant check-up, to assure that lubrication, generator, and cooling system are "perking" for full production!



New Fold-over Seat Aids Fast, Centralized Servicing! New fold-over seat of the TD-6 and TD-9 models allows operator to give you the time and convenience advantages of centralized steering clutch assembly servicing. Lubricant fittings are conveniently grouped and fully accessible!

Thorough air filtration assured by new under-hood cleaner! Instead of being "in your lap," or a knee-bumping obstruction, air cleaners of the new International crawlers are side-mounted—for easy accessibility, yet out of the way. They have big capacity and high efficiency, too, for positive air filtration!



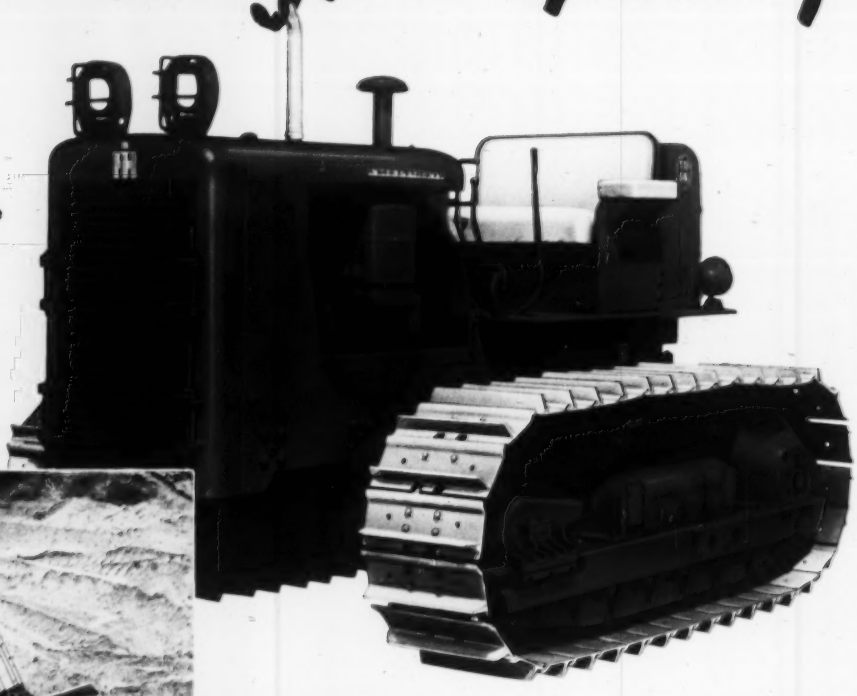
International® Crawlers gi

plus new design to speed yo

95 Net Engine Horsepower.

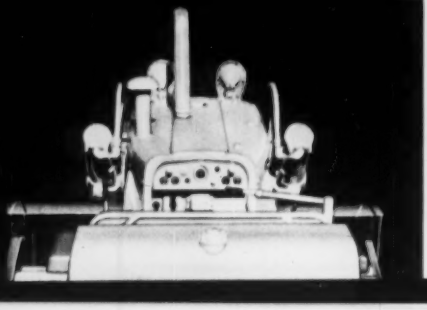
142 Series

TD 14

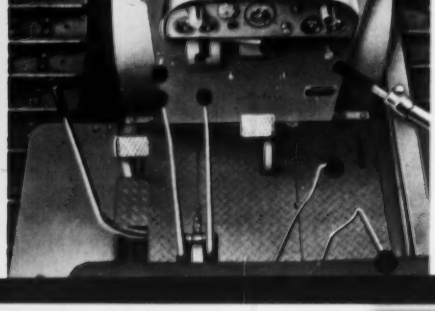


TD-14 (series 142), 78.5 drawbar hp; weighs 21,095 pounds (without equipment). Features "new look" engineering, job-speeding visibility, new equipment-carrying and operating strength. All-weather electric starting, standard equipment. It's a fast, responsive, big-capacity dozing tractor. Powers 2¼ cu. yd. International Drott Skid-Shovel or Four-In-One; 15-ton capacity Superior Pipe-Boom; other similar-sized equipment.

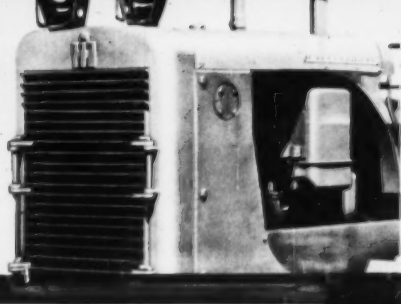
Control Tower Visibility adds operating efficiency! See how new International crawlers are streamlined for complete job-control visibility. Seat is amply high to provide full view of equipment, terrain, and variations requiring operator action, to maintain efficiency.



Clean, safe deck cleared for action! Look down on that safe, clean, flush deck —a platform for full production. The wide, man-size seat is fully-adjustable; foam rubber padded. Instruments centralized for one-glance check-up! Even a cigarette lighter is provided, to prevent needless stops!



Pressurized Closed Cooling System for Positive Performance Protection! New pressurized cooling systems provide fast warm-up under thermostatic control—and positive ideal temperature control with forced circulation through full-length jackets. That aids clean combustion, guards oil film strength, protects performance. Radiator core assembly is easily-removable, without disturbing radiator guard or mounted equipment.

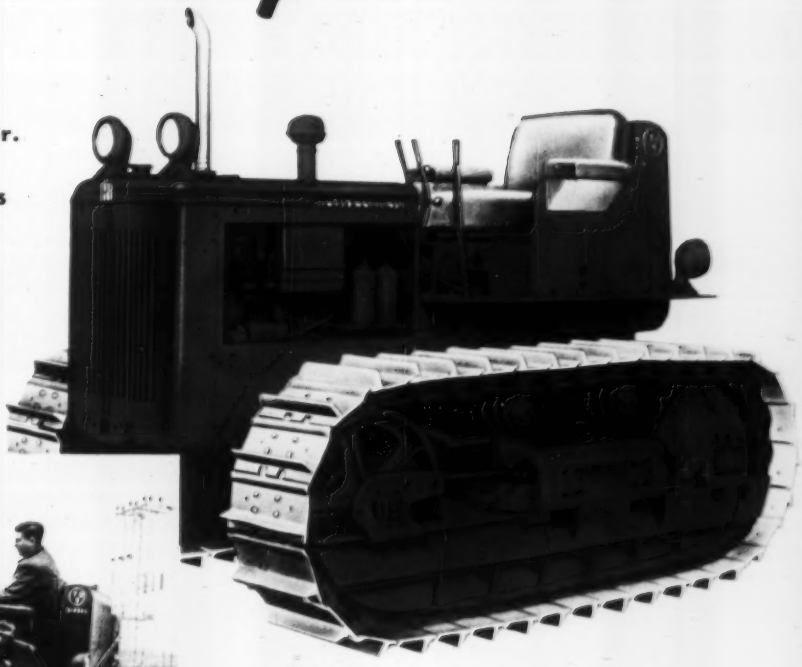


...give you Bonus horsepower—...your jobs, control your costs!

66 Net Engine Horsepower. In International Drott Machines, Engine develops 71 Net Horsepower.

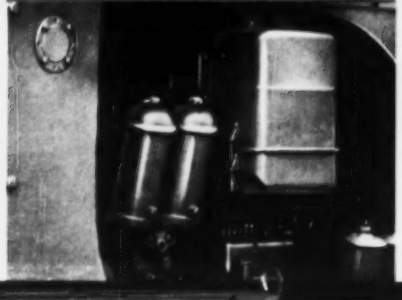
91 Series

TD 9



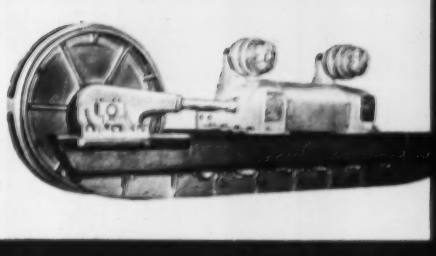
TD-9 diesel, (series 91), delivers 54.5 drawbar hp—up 32%. Operating weight (5-roller model), without equipment, 12,000 pounds. Now up in a new heavy-duty job range. New power is backed by new power train and track frame strength, new operating and servicing ease. Powers International Drott 1½ cu. yd. Skid-Shovel and other equipment requiring similar power.

480-hr. full-flow lube oil filters guard bearings, cut upkeep! Every drop of oil on its way to lubricate moving engine parts must pass through these new abrasive-trapping micron-type filters—with the capacity, strength, and efficiency to give 480 hours of wear-fighting, upkeep-cutting duty!



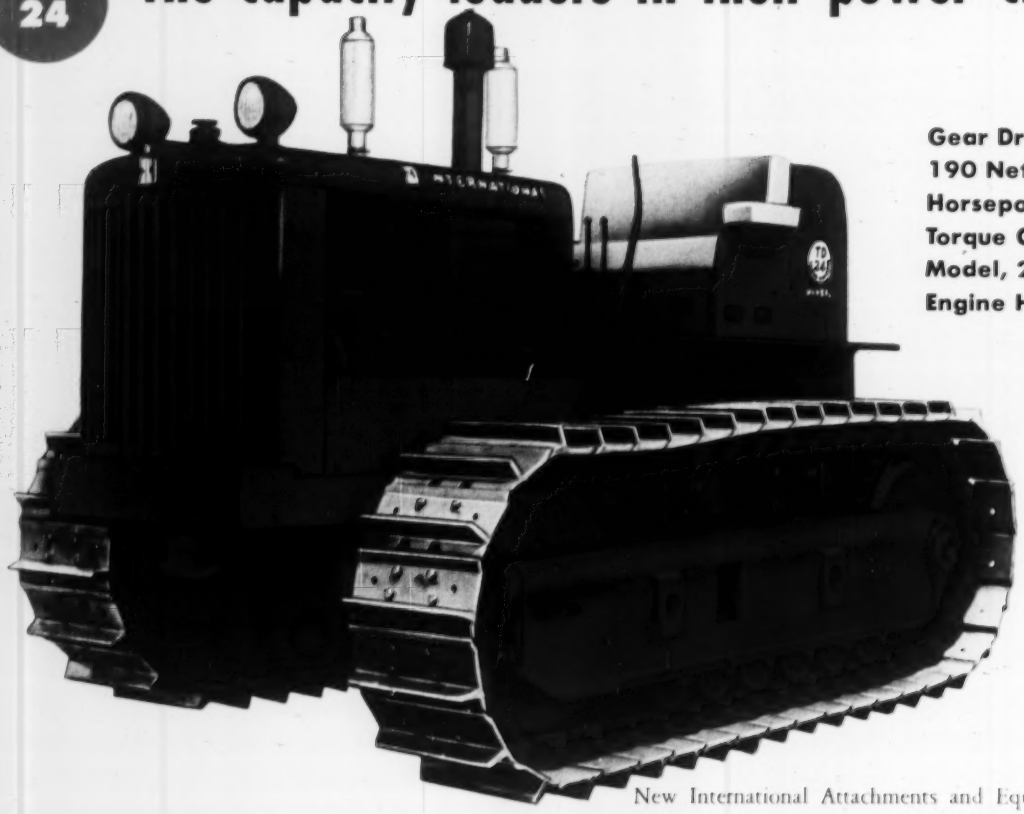
Hydraulic Power Steering Inspires Operator Cooperation! New hydraulic power steering of the TD-14 and TD-18 cuts operator fatigue—and along with the other big effort-saving advantages, makes it easier than ever to deliver full-capacity production! TD-6 and TD-9 have spring boosters to lighten the operator's job.

"Bridge-strong" track frames for "slam-bang" conditions! You are looking at the strongest track frame in the industry for crawlers of TD-18 and TD-14 size! Heavy steel box-section beams, weld-joined to heavy stress-relieved steel plates—and rigidly gusset-braced—they're your foundations for record-making "rough-and-tumble" performance!



TD 24

The capacity leaders in their power class



Gear Drive Model, 190 Net Engine Horsepower
Torque Converter Model, 200 Net Engine Horsepower

Massive—with 43,080 pounds of rock-dozing, scraper-pushing brawn (7-roller torque converter model)*—the TD-24 can give them all a lesson in operating ease, big capacity, and positive load control! Has instant high-low range and exclusive Planet Power steering to give you its tremendous *pushing*, *pulling*, and *lifting* power on any terrain—with responsiveness not available elsewhere! *Live power on both tracks, on every turn!* Backed by equipment engineered to match its strength and power!

*Gear Drive 7-roller model weighs 42,780.

New International Attachments and Equipment team with new bonus-powered crawlers to give you high-producing performance packages: 42 new Bulldozers, to fit your needs exactly . . . 4 new Drott Loaders, 1 to 3-cubic yard capacity . . . 4 new Superior® Pipe-Booms, 8 to 55-ton capacity; 3 job-proved PCU'S! . . . **Measure . . . compare . . . prove to yourself . . . new bonus-powered International crawler tractors beat anything else on tracks! Try this turnpike-paced new power for capacity, operator preference, profit potential. Ask your International Industrial Power Distributor for a bonus-powered demonstration *to your specifications!***

INTERNATIONAL HARVESTER

International Industrial Power

INTERNATIONAL HARVESTER COMPANY, 180 N. Michigan Ave., Chicago 1, Illinois

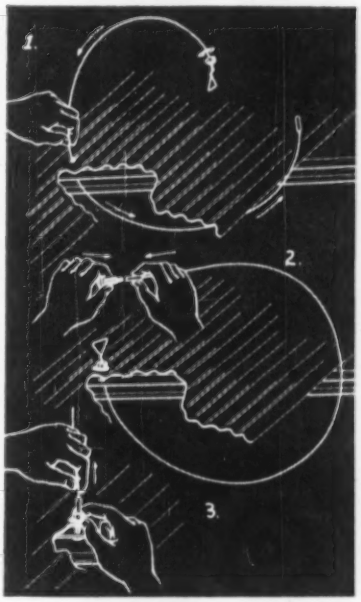
A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Pipe-Boom Tractors . . . Self-Propelled Scrapers and Bottom-Dumps . . . Tractor and Rubber-tired Loaders . . . Diesel and Carbureted Engines . . . Motor Trucks.

Bolts for Corrugated Panels Can Be Set by One Man

Because of a wire-and-brass sleeve attachment, the DS Bolt, a new-type fastener for corrugated roofing and siding, can be installed from the outside by only one man. It is bolted through the ridge rather than the valley of the corrugations to permit expansion and contraction of the sheathing without shearing the bolt, and to reduce corrosion.

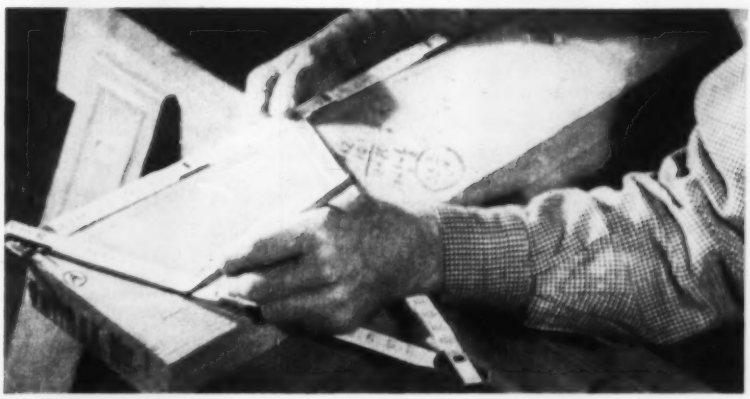
Components required for each fastening are a composition washer, a combined metal and neoprene washer, a stainless-steel double-chamfered nut, and a wire with a brass sleeve attached at one end. The DS Bolt is reduced in diameter for a quarter length from its end to allow it to be threaded on the brass sleeve.

Several nuts and washers are first strung on the wire. The brass sleeve at the end of the wire is then pushed down through the drill hole in the corrugated sheets. After looping the wire back around the panel to within reach, the workman threads the reduced end of a DS Bolt into the brass sleeve. He then withdraws the wire back through the drilled hole, thus seating the bolt in its final inverted position. Washer and nut are now hand tightened over the protruding



end of the bolt. At this point the sleeve and wire can be removed and the nut given its final tightening with a power wrench. Torque required for tightening is said to be less than for other types of fasteners. Delbert L. Smith Co., Inc., 525 Chartiers Ave., McKees Rocks, Pa.

(*New Products continued on page 72*)



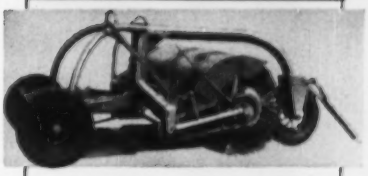
Folding Rule Eases Rafter Layout

Speed, simplicity and accuracy in the layout of rafters are claimed for a new six-foot, folding wood rule with special markings on its reverse side. The conventional framing square is discarded in working on common, hip, valley and jack rafters.

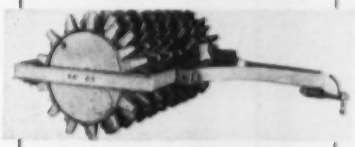
The angular folds are manipulated to form triangles, the bases of which are held against the side or edge of the lumber. The desired triangle is made by placing a notch in the metal end of the rule over the proper bull's eye on the reverse side, and held by the thumb while the cut mark is made.

The Master Framing Rule, the manufacturer claims, is easily carried, and is precalculated to eliminate additive errors of stepping off rafter lengths with a square. Special markings also make possible use of the rule as a square, for miter cuts and for laying out any angle from 0 to 90 deg. Master Rule Mfg. Co., Middletown, N. Y.

Grace
ASPHALT AND COMPACTION EQUIPMENT

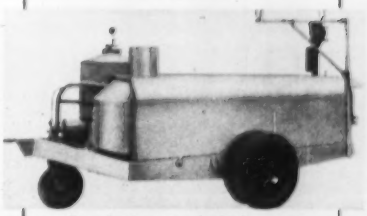


Roadsweepers, traction, engine-driven or tractor-mounted

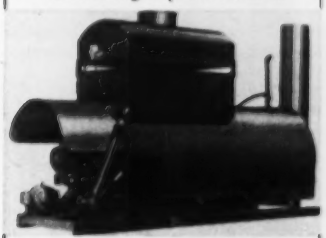


Sheepsfoot rollers

Chip spreaders



Circulating asphalt heaters



Automatic oil heaters for hot plants

Pneumatic rollers, self-propelled or trailed

W. E. GRACE MFG. CO.
6015 S. LAMAR, DALLAS, TEXAS

The
"COMMERCIAL INDUSTRIAL"
Model

MORRISON
Roly-Door
STEEL SECTIONAL
OVERHEAD DOORS

CLEAN, MODERN FUNCTIONAL LINES that blend smoothly with all types of architecture are the hallmark of Morrison Roly-Doors.

SIMPLIFIED DESIGN ensures safe, easy, trouble-free installation and operation . . . manual, electrical and by remote control.

BONDERIZED, ALL-STEEL CONSTRUCTION provides lasting good looks and a durability that defies the weather and years of hard use.

ECONOMICAL INSTALLED COST made possible by sound engineering and precise mass production . . . Morrison Roly-Doors are competitively priced.

OVER 1000 STANDARD SIZES ready for immediate delivery provide a Morrison Roly-Door for every overhead door requirement.

PROMPT DELIVERY, EXPERT INSTALLATION SERVICE by Morrison Roly-Door Distributors and Dealer-Installers located in all principal cities.

Complete Information and Detailed Specifications are available from:

Roly-Door Division
MORRISON STEEL PRODUCTS, Inc.
653 Amherst Street, Buffalo 7, N. Y.

Also manufacturers of MOR-SUN WARM AIR FURNACES AND AIR CONDITIONERS and MORRISON SERVICE BODIES.

IN CANADA: OVERHEAD DOOR SUPPLIERS
1330 Bloor St., W., Toronto 4, Ont.

Improved Ceiling Grinder

Spring action (arrow) at the grinding wheel is an improvement made on the Giraffe to lighten the job of rubbing concrete ceilings. It maintains uniform pressure, compensates for floor irregularities and slopes, and makes minor adjustments unnecessary.

One man can cover about 4,000 sq ft per day, according to the manufacturer, without having to erect scaffolds or decks.

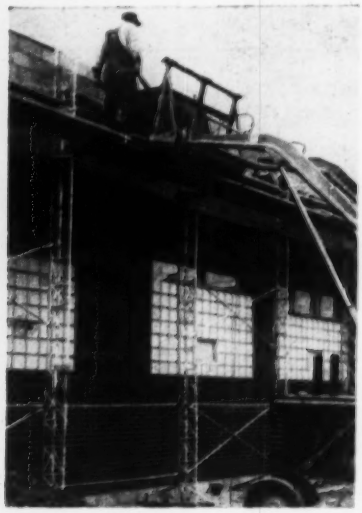
Powered by a ¾-hp 110-v motor, the various grinding heads quickly level form marks and other surface blemishes, even nails. Narrow enough to go through door openings and light enough for easy portability, the Giraffe is marketed in heights up to 24 ft. Concrete Grinding Corp., 300 Straight St., Paterson, N. J.

Redesigned AS Spreader Is Transportable, Quick

A 1956 model AS bituminous concrete and aggregate spreader is now on the market, incorporating some changes from previous models.

One addition is an accurate scale on each end of the screed that permits the operator to make correct setting for thickness of spread desired. Wheelbase has been increased to permit the floating screed to travel on a level plane, regardless of base. An improved quick hookup is also included for carrying the unit on the back of a dump truck from job to job.

And as optional equipment, the manufacturer offers a hand-operated hydraulic shut-off gate to stop the flow of material and eliminate the necessity of emptying the spreader when changing course. The screed can be ordered with adjustments for crowning jobs, and with units for heating the screed quickly. Highway Equipment Co., Inc., Cedar Rapids, Iowa.



Steel Scaffold Carries Platforms for Men, Materials

A new trussed-steel adjustable scaffold for masonry work features separate platforms for mason, materials and laborer. A 10-ft tower-base section plus interchangeable 2-ft, 6-ft and 10-ft extensions provide sufficient height for work up to 23 ft high.

The three-platform carriage is cable-suspended from the top of the tower and adjusts to any height. A special carriage is available for widening the lower platforms to accommodate two-way traffic or heavy materials storage. The three extension segments fit into the tower-base section. The scaffolding sets up without tools or bolts. Towers are designed for five-ton loads. Morgen Mfg. Co., Yankton, S. D.

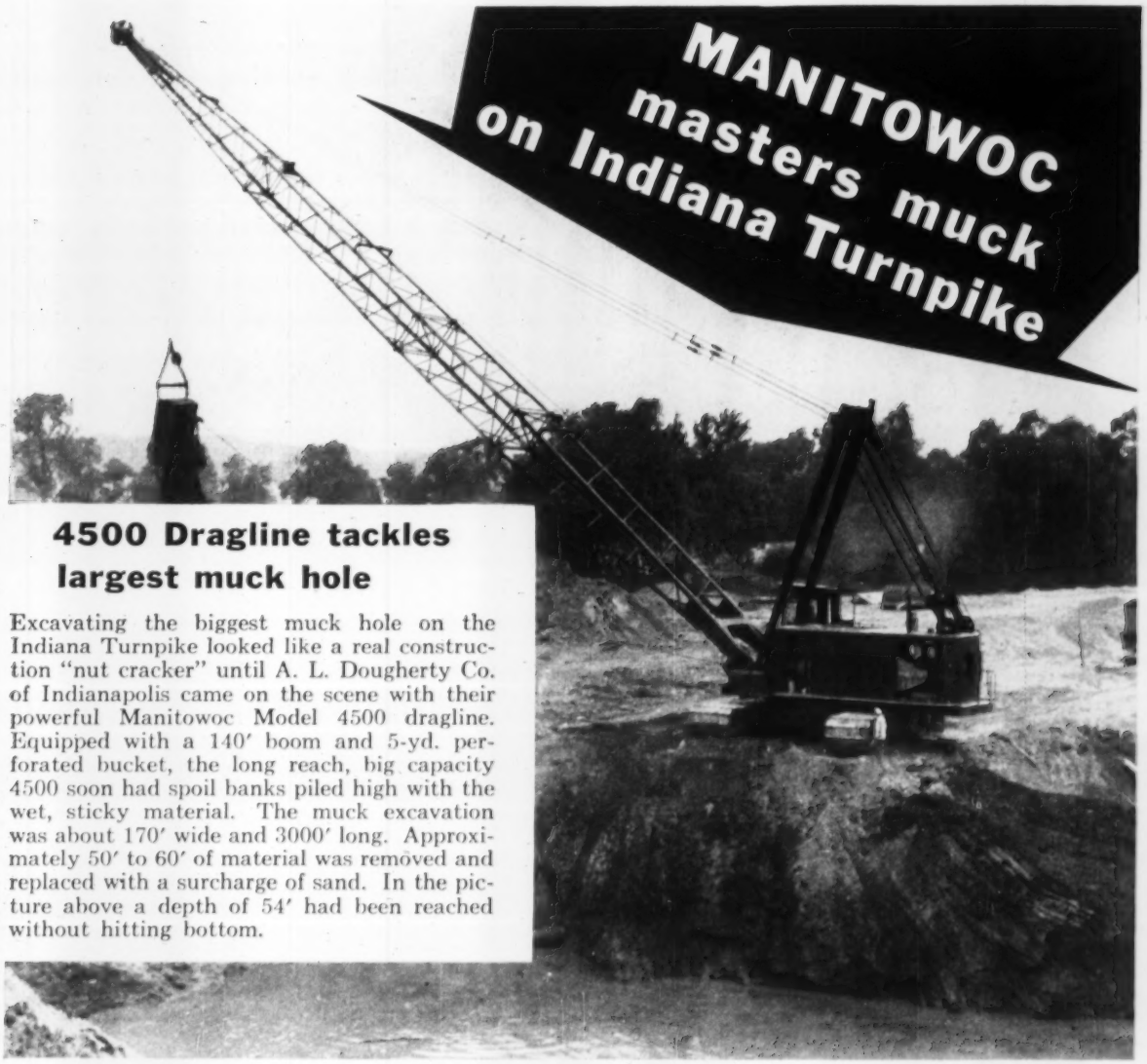
Wool-Plastic Weatherproofs And Silences Sliding Sash

Wood-pile weather stripping, backed with pliable, extruded plastic, has been developed for application around windows, doors and sliding panels. The weather seal is claimed, after extensive testing, to be stick-proof, self-adjusting, non-matting, exceptionally durable, and proof against corrosion, rot and mold.

A further advantage claimed for sliding units (double-hung windows and sliding inserts, for example) is smooth, silent operation.

Sold in both continuous-length rolls and do-it-yourself kits, the stripping is made in 90 extruded shapes with a varied selection of pile depths and densities. The manufacturer supplies literature and a sample on request. Schlegel Co., Div. P-1, Rochester 7, N. Y.

MANITOWOC masters muck on Indiana Turnpike



4500 Dragline tackles largest muck hole

Excavating the biggest muck hole on the Indiana Turnpike looked like a real construction "nut cracker" until A. L. Dougherty Co. of Indianapolis came on the scene with their powerful Manitowoc Model 4500 dragline. Equipped with a 140′ boom and 5-yd. perforated bucket, the long reach, big capacity 4500 soon had spoil banks piled high with the wet, sticky material. The muck excavation was about 170′ wide and 3000′ long. Approximately 50′ to 60′ of material was removed and replaced with a surcharge of sand. In the picture above a depth of 54′ had been reached without hitting bottom.

You need outstanding Dragline performance for tough jobs like this

• **POSITIVE STABILITY** assures full capacity buckets with any length boom. You get more heaped loads from one position, cutting down on the number of machine moves. Long, wide crawlers with low ground pressure let you work in soft, hard-to-reach spots and travel over soft ground without mats.

• **MORE POWER** through simple, clean design. There's less dead weight — less maintenance . . . more power for top performance every shift. Fewer parts provide more effective utilization of power. Fuel consumption is lowered for most economical operation possible with a machine of this size. Single diesel power plant eliminates need for several electric motors and thousands of electric wires and connections . . . greater mobility without dangerous, awkward cables dragging from machine.

• **FAST CONVERTIBILITY** to shovel and crane operation makes the 4500 a versatile unit for any type of construction job. Big capacity, 5½-yd. shovel is engineered for your roughest jobs. 100 ton crane is ideal for heavy construction work. Manitowoc Engineering Corp., Manitowoc, Wis.

Your MANITOWOC distributor has all the facts on the Powerful 4500 . . . contact him now!

MANITOWOC

SHOVELS 1 - 5½ YD. Speedcrane CRANES 20-100 TON

Gurley **Current Meters for measuring stream velocity in:**

Fresh water–rivers, streams, canals, lakes

Salt or brackish water–with a newly-designed salt water model

Shallow or sluggish streams–with the Pygmy Current Meter

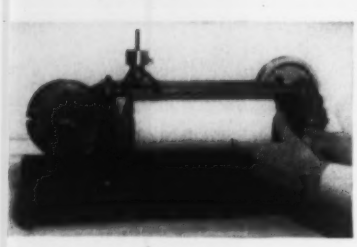
Industrial waste and sewage–where solids permit ...the Gurley Current Meter is made of non-corroding materials.

Gurley Current Meters have been the standard of the profession since 1870. Highly-standardized, easily-disassembled for cleaning...simple, precise and rugged. Write for "Gurley Current Meters" (Bulletin No. 700).

Gurley Graphic Water Level Recorders

Continuous record on graph chart for 24 hours or 8 days. Positive response to fluctuation by float, perforated tape and sprocket wheel. Finest quality "Chelsea" marine clock. Metal base and cover. Made of non-corrosive materials throughout. Ranges 1 to 40 ft., or 30 cm. to 12 meters.

Use Gurley Graphic Water Level Recorders when you need dependable records of reservoirs, hydro plants, sewers and sewage systems, irrigation and stream gaging. *Write for Bulletin No. 50 and details on Gurley Water Level Recorders.*



GURLEY

W. & L. E. GURLEY HYDRAULIC INSTRUMENTS DIVISION
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Gurley–Since 1845

Publications

Creosoted timber piles–This 66-page booklet contains information on pile-driving formulas, safe-load determination, uplift and later-force problems, protective devices for use in driving, and the driving and loading of test piles of pressure creosoted timber. Also included are ASTM specifications for use in pile selection, treatment standards of the American Wood Preservers Association, and excerpts from principal basic building codes. In-service performance is indicated by illustrations, case histories and inspection reports on wood-pile installations. The booklet is supplied free to architects, engineers and builders. American Wood Preservers Institute, 111 W. Washington St., Chicago 2, Ill.

Hollow glass building blocks–Owens-Illinois glass block is described in a well illustrated 24-page catalog containing specifications, standard dimensions and patterns, installation methods and construction details. Also presented are technical data on strength, sound reduction, heat loss, surface condensation, spectral transmittance and other properties. Tables and text show how to calculate illumination and brightness, solar heat gain, and fuel savings. Kimble Glass Co., Toledo 1, Ohio.

Glued laminated wood – Technical data on glued laminated Southern Pine fills half an eight-page illustrated booklet entitled Architect's Bulletin No. 8. Besides commenting briefly on design procedures for arches and beams, the bulletin runs through the design of a straight beam. Specifications given incorporate typical working stresses and standard finishes. Tabulated properties of rectangular sections include moment of inertia, section modulus, fbm per lin ft, and weight per lin ft. Southern Pine Association, New Orleans, La.

Concrete's wild horses–To obtain better, uniform quality concrete, the builder must control the three wild horses of concrete–water, air, and rate of hardening. A 30-min color film, entitled "The Man with the Trowel," is now available that shows how quality concrete is produced by controlling these three variables with Pozzolith. The film covers the problems in meeting concrete requirements brought about by variables in materials and conditions. The Master Builders Co., 7016 Euclid Avenue, Cleveland 3, Ohio.

Radiant heating systems—Aimed to help architects, engineers, heating contractors and others, an eight-page illustrated booklet on wrought-iron radiant-heat piping systems incorporates such construction recommendations as: Account for thermal resistance of floor covering when figuring heat output; weld hard-to-get-at pipe joints; use dense—not lightweight insulating—concrete for heating slabs; insulate against perimeter heat loss, but not necessarily underneath on-grade slabs. Cross-section sketches of on-grade and above-grade installations depict several arrangements of system elements, such as slab, coils and membranes. Numbers indicate relative preference of the different schemes. Also of interest to the reader is a listing of the other wrought iron publications that are available from the manufacturer. A. M. Byers Co., Box 1076, Pittsburgh 30, Pa.

Portable compressor—A new addition to the Ingersoll-Rand line, a 900 cfm size machine, is described in a new booklet. The new machine weighs 14,340 lb. is equipped with a 6-cylinder engine, and batteries coupled with an ether-capsule system insure starting at extremely low temperatures. Delivering its 900 cfm at 100 psi, the machine can operate 10 jackhammers or 7 wagon jacks (with light drifters) or 3 wagon drills with heavy drifters. Ingersoll-Rand, 11 Broadway, N. Y. 4.

Trenching machine—A 16-page catalog describes the Model 150 Trenchliner. Photographs and drawings help describe the reversible and shiftable arc type spoil conveyor and the dual purpose friction clutch. The all-welded unit constructed frame and oil bath lubricated gears are also treated. Parsons Co., Newton, Iowa.

From end to end—A new bulletin illustrates how to achieve a wide variety of end finishes with corrugated metal pipe installations. Among these are end sections, square, beveled and skewed ends, riprap, sheeting, drop inlet, cantilevered ends and spillways. The bulletin is available from: Product Information Service, Armco Drainage & Metal Products, Inc., Middleton, Ohio.

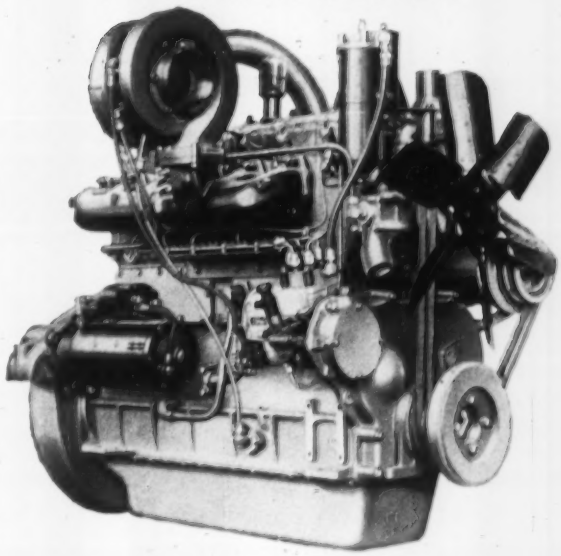
Highway information on Fletcher granite highway products are available in a 23 page bulletin. Also included are 1956 list prices for firm quotations to delivery point, or other data. Granite, H. E. Fletcher Co., West Chelmsford, Mass.

MODEL 180 MICHIGAN TURBO-DOZER—2¼ CU. YD. CAPACITY
power tilting bowl • all wheel drive • rear wheel steering
Waukesha Turbodiesel Engine • Clark torque converter and
power shift transmission, 4-speed full reversing type.

MICHIGAN
Turbo-Dozer

engineered and manufactured by Clark Equipment Company, Construction Machinery Division, Benton Harbor, Mich.

WAUKESHA
Turbodiesel



WAUKESHA MODEL 135-DKBS TURBODIESEL—165 HP at 2200 RPM—a 426 cubic inch Supercharged Diesel, 6-cyl., 4¼" x 5" with lively acceleration, clean burning, a tremendous reserve of power and great overall economy. Send for descriptive Bulletin 1617.

WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN
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because it's fireproof, weatherproof, needs no maintenance

To withstand the severe climate changes in Barre, Vermont, the Rock of Ages Corporation turned to Ruberoid Corrugated Asbestos for exterior siding in their modern, new plant. Resistant to acids, fumes, smoke and steam, Ruberoid Corrugated assures long life for any plant need. It is noncorrosive . . . fireproof . . . eliminates expensive painting maintenance . . . assures lower construction costs. Installation on skeleton frame construction means less expensive footings and framing. For roofing, siding or indoor partitioning, Ruberoid Corrugated Asbestos saves time and expense in construction, keeps maintenance at a minimum year after year.

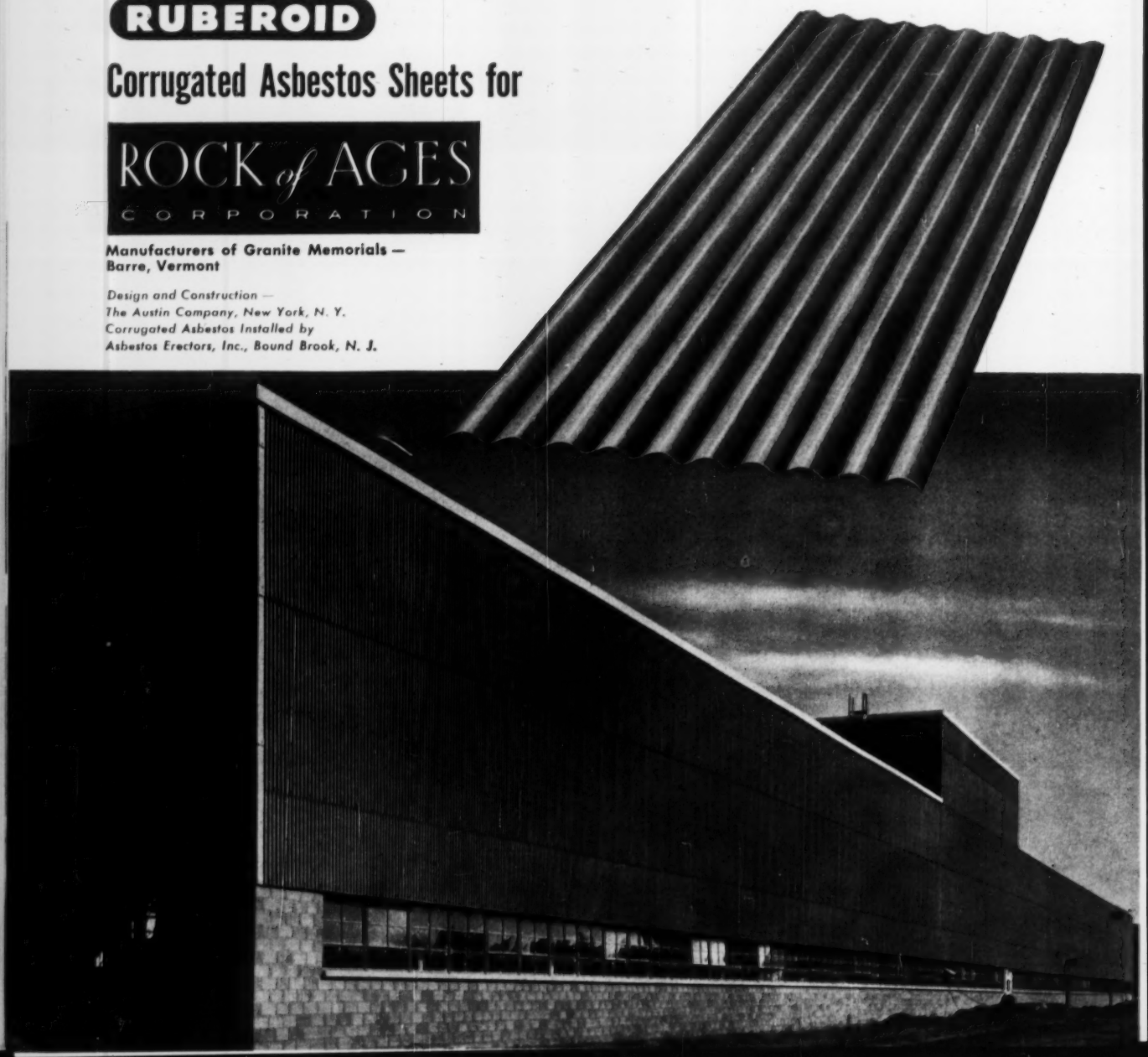
RUBEROID

Corrugated Asbestos Sheets for

ROCK of AGES
CORPORATION

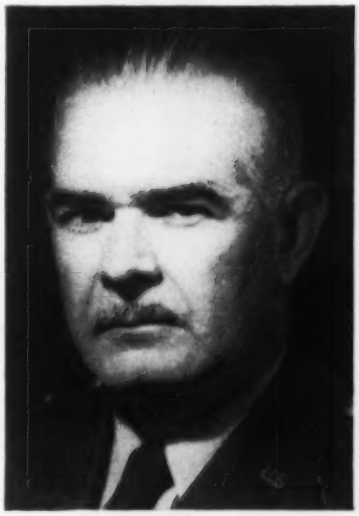
**Manufacturers of Granite Memorials —
Barre, Vermont**

Design and Construction —
The Austin Company, New York, N. Y.
Corrugated Asbestos Installed by
Asbestos Erectors, Inc., Bound Brook, N. J.



Talley Will Retire

Col. Lincoln will become the Mediterranean Division Engineer next month



Brig. Gen. B. B. Talley

Brig. Gen. Benjamin B. Talley, the Corps of Engineers' Mediterranean Division Engineer, will retire on May 1, after 30 years of Army service.

As division engineer with headquarters in Nouasseur, French Morocco, since last July, Gen. Talley's responsibility has embraced the vast U. S. military construction program extending across North Africa from the Atlantic Ocean to the Persian Gulf. Bulk of the work has related to the network of North African Air Force bases—four in French Morocco, one in Libya and one in Saudi Arabia (ENR Aug. 11, 1955, p. 34).

Col. Lawrence J. Lincoln, now Acting Chief of Staff for the Fourth Army in Fort Sam Houston, Texas, will take over the Mediterranean command, following Gen. Talley's retirement.

A native of Oklahoma and a former electrical engineer with Westinghouse Electric Company, Gen. Talley has had a distinguished army career, covering both the military and civil functions of the Corps of Engineers. He holds several top citations for combat service in the European and Pacific theaters during World War II, initiated many of the flood control projects along the Ohio River, and, a specialist in aerial photography, invented a variety of optical aides, including the "Talleyscope" for view-

Capt. H. B. Jones

Capt. A. D. Hunter

Two Engineering Naval Officers Are Reassigned

Capt. H. B. Jones, CEC, USN, has been assigned to the newly established post of executive assistant to Rear Admiral R. H. Meade, Chief of the Navy's Bureau of Yards and Docks. Capt. Jones was formerly the District Public Works Officer of Fourth Naval District at Philadelphia.

Other changes in the Navy's Civil Engineer Corps include the assignment of Capt. A. D. Hunter, CEC, USN, as District Civil Engineer for the Eleventh Naval District, with headquarters in San Diego. A former Deputy Chief of the Bureau of Yards and Docks, Capt. Hunter was Commanding Officer of the Naval Construction Center at Davisville, Rhode Island.

Sound powered TELEPHONES NEED NO CURRENT

For temporary use on construction work, these instruments move with the job as it progresses. Also for permanent installation on industrial projects. Indoor or outdoor models in selective or common ringing and semi-selective or common talking.

Positive communication is assured at all times because no batteries or current of any kind are required. Cost of upkeep is negligible.

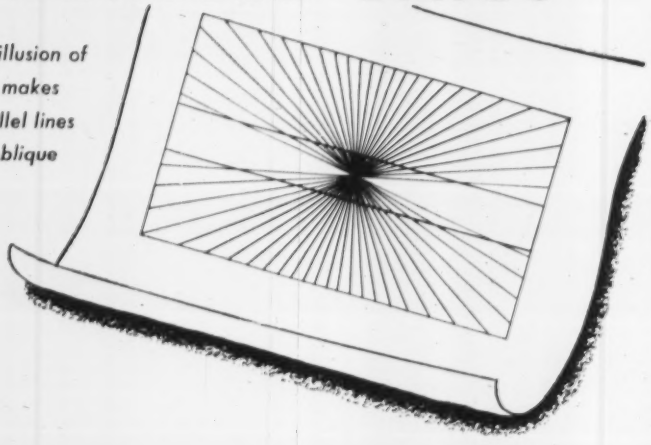
Photo shows Model "K" Phone in use on Niagara River project. General Contractors, Herbert F. Darling, Williamsville, N. Y.

WRITE FOR ILLUSTRATED CATALOG

HOSE-McCANN TELEPHONE CO., INC.
761 THIRD AVENUE
BROOKLYN 32, N. Y.

The Strange Case of the PARALLEL LINES

Hering's illusion of direction makes two parallel lines appear oblique



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ARKWRIGHT PROVIDES SHARPER PRINTS. Its greater transparency is achieved by special mechanical methods. Maximum transparency is the key to the clean, sharp reproduction of Arkwright.

ARKWRIGHT GIVES LONGER LIFE. By increasing transparency by mechancial method and not with surface oils, Arkwright resists opacity and brittleness. Its durable finish prevents tearing, fraying and curling.

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WRITE FOR FREE SAMPLES of the brand known as "America's Standard." Arkwright Finishing Co., Industrial National Bank Building, Providence, R. I.

ARKWRIGHT
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AMERICA'S STANDARD FOR OVER 34 YEARS

ing aerial photos in three dimensions.

His career includes service as district engineer at Huntington, W. Va., and Louisville, Ky., and as division engineer for the North Atlantic Division. During the war, he took part in the battle of Attu and supervised military construction in Alaska; he made the landings in Normandy and commanded Omaha Beach and the Normandy Base Section; and, later transferred to the Pacific, had had charge of beachhead operations on Okinawa. After V-J Day, he served in Korea as Deputy Commander of Army Service Forces.

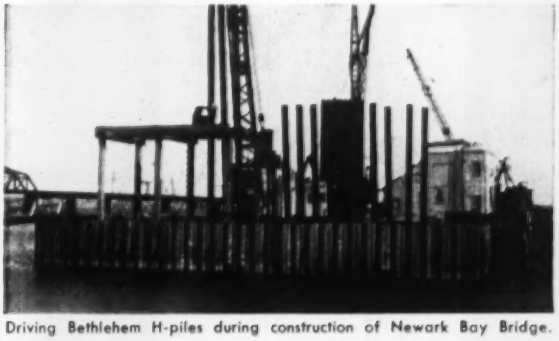
Col. Lincoln, who will succeed Gen. Talley, has been at Fort Sam Houston since 1954. A civil engineering graduate of Princeton University, he is a former district engineer at Denver and Kansas City. During World War II, he served in the Southeast Asia Command, India, and in the Pacific Theater.

(*Men and Jobs continued on page 80*)

Frazza Accepts BDSA Post

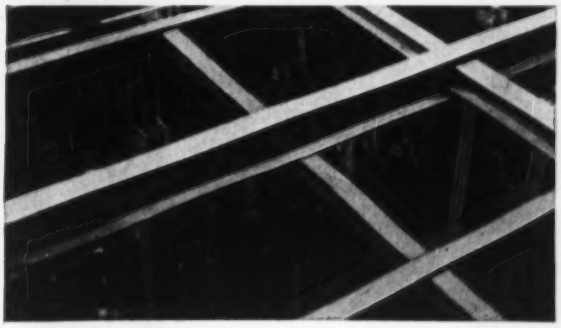
Louis F. Frazza of Hawthorne, N. J., was sworn in last month as Director of the Water and Sewerage Industry and Utilities Division, Business and Defense Services Administration, U. S. Department of Commerce, by BDSA Administrator Charles Honeywell. Now an executive in the Transite Pipe Division of Johns-Manville Sales Corporation, Frazza was formerly a contractor in Paterson. The BDSA post rotates among key business executives who serve without compensation for periods of six months or more.

Newark Bay Bridge piers rest on Bethlehem H-piles



Driving Bethlehem H-piles during construction of Newark Bay Bridge.

Bethlehem H-piles were cut off after driving to bedrock in cofferdams.



Newest link between New York City and points to the south and west is the $40 million Newark Bay Bridge. This project of the New Jersey Turnpike Authority is part of eight miles of expressway which will connect the Holland Tunnel with the Turnpike at the Newark Airport interchange.

With approaches, the bridge is 9,500 ft long, stretching from the abutment on the east end to the beam spans of the connecting viaduct on the west. There are two 36-ft roadways, each containing three lanes and separated by a 4-ft center mall.

Bethlehem furnished 16,600 tons of steel H-piles for the Newark Bay Bridge. Dravo Corporation, of Pittsburgh, was contractor for over-water piers; Merritt, Chapman & Scott Corporation, New York, was contractor for land-based piers and abutments. Howard, Needles, Tammen & Bergendoff, of New York, were consulting engineers for the project.

The Bethlehem steel H-piles used in the project were furnished in single pieces up to 100 ft in length, and spliced for lengths of from 100 ft to 128 ft. They were driven through meadow marsh to bedrock.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

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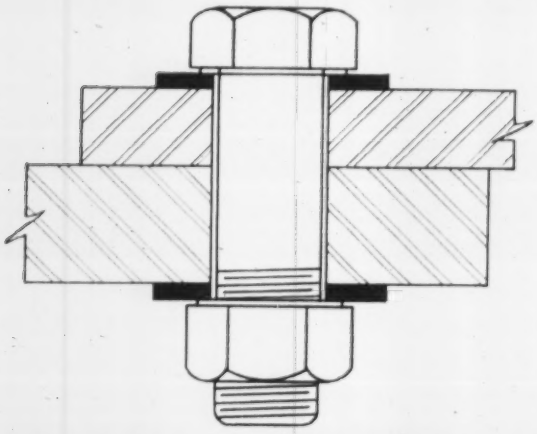
CARBURIZED WASHERS



for GREATER CLAMPING FORCE in High Strength Steel Bolting

Structural engineers and contractors *know* today that high strength steel bolts, *with properly hardened MIL-CARB* steel washers,* provide a form of steel jointing superior to riveting in many ways . . . including faster, more economical construction.

Don't overlook the fact that *no bolt is any better than its washers!* Don't let washers be the weak link in your steel framing construction chain. MIL-CARB carburizing permits *securing* and *holding* desired tension — eliminates "galling" or grinding of washer by the nut, *assuring permanent, uniformly strong, tight joints.*

MIL-CARB Washers are fabricated from Prime Carburizing Quality Special Soundness Steel to insure uniform quality control, always equal to or exceeding the rigid specifications for high strength bolted steel construction.

For your own protection and for uniformly sound construction, specify MIL-CARB* Carburized Washers and accept no substitutes.

Since 1887

MILWAUKEE WROT WASHERS

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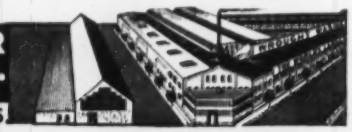

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. . . Men and Jobs

Bureau of Standards Gives Hubert Snoke Another Post

The National Bureau of Standards has appointed Hubert R. Snoke, an authority on bituminous roofing materials, as assistant chief of its Building Technology Division.

During his 36 years with the bureau, Snoke has engaged in extensive research on paint, varnish and bituminous materials, and has won both the Superior Accomplishment and Meritorious Service Awards of the Department of Commerce. His reports on roofing materials and their weathering qualities have been widely accepted both here and abroad.

In addition to his new duties, Snoke will continue to head the building division's Floor, Roof and Wall Covering Section.

Men and Jobs Briefs . . .

• **Associations**—The Ohio Society of Professional Engineers installs Alfred H. Samborn of Samborn, Steketee & Associates, Toledo consulting engineers, as president . . . Kentucky Crushed Stone Association elects **Emil Berry** of Anchorage, Ky., as president . . . **James B. Crowley** is named executive director of the Unit Masonry Association of Metropolitan St. Louis, Mo.

• **Corps of Engineers**—**Col. Edward D. Comm** is appointed district engineer in Louisville, Ky., succeeding **Col. W. D. Milne,** who is leaving to attend the Army War College . . . **Col. Eugene J. Stann** is named district engineer of the Nashville district, replacing **Col. Gilbert M. Dorland,** who is retiring July 1 to join the Nashville Bridge Company as assistant to the president.

• **Careers**—Assistant district engineer for the U. S. Bureau of Public Roads in Sacramento, Calif., **Thomas M. Roach,** resigns from the agency to work in Colombia with the Raymond Concrete Pile Co. . . . **Arthur N. Sollee** named executive director of the Jacksonville (Fla.) Expressway Authority, resigns from the office of county engineer, Duval County, and is succeeded by **John H. Crosby** . . . **Eugene A. Schmidt,** formerly in charge of the engineering division of the Milwaukee city engineer's department, is appointed assistant city engineer of Milwaukee, Wis.

• **Business**—John W. Cowper Company, Inc., engineers and contractors

of Buffalo, N. Y., elects **Fred O. Francis**, chief engineer of the company, as vice president . . . **Walter H. Frick** and **John M. Sweeney** form a partnership as consulting architectural engineers under the name of Frick & Sweeney in Pittsburgh, Pa. . . . **Louis S. Bernstein**, chief design engineer with the Niagara Mohawk Power Corporation since 1935, is appointed an engineering consultant to the Company's Project Engineering Department . . . **B. Raymond Sayer** is named manager of plant location surveys for The Austin Company, engineering and construction firm with headquarters in Cleveland, Ohio.

• **Education**—Saint Louis University's Institute of Technology names **Rev. Victor J. Blum, S.J.** dean, succeeding the late Rev. James B. Macelwane, S.J.

• **Honors**—Assistant professor of civil engineering, **Alfred C. Ingersoll**, at the California Institute of Technology is elected national president of Chi Epsilon, an engineering honor fraternity.

Obituaries

Wendell H. Davis, 55, died March 8 at Washington, D. C. While serving with the construction branch of the Corps of Engineers, Davis was credited with the discovery of a photographic method for reproduction of construction drawings. Until his death, he had been employed with the civil works division at the office of the Chief of Engineers.

Frank P. Fahy, 73, retired consulting engineer and inventor of permeameters for testing the permeability of steel, died March 26. A graduate of Yale University in 1902, Fahy had offices in New York from 1917 until his retirement in 1952.

Eustace Hulsapple, 72, retired civil engineer, died March 13 at White Plains, N. Y. A graduate of Union College, he had been employed by the Charles H. Sells engineering office, Pleasantville, N. Y.

Hugh S. Gilhams, 66, president of H. S. Gilhams Co., Philadelphia consulting engineers, died March 12. He was a graduate of Purdue University in 1913.

Spencer Roberts, 63, engineer for the Army Engineers Corps, Philadelphia, died March 10. He had been previously employed by the state highway department. Roberts was a graduate of the University of Pennsylvania.

You can see . . .

HERCULES ENGINES are popular...
but let's talk performance.

Popularity isn't the only reason Hercules Engines power these well-known makes of air compressors. The main reason these companies select Hercules Engines is that they provide dependable power—engineered to the requirements of the compressor.

Air compressors, like other types of equipment, are designed by the manufacturer for specific capacities. They need an engine that will produce the rated power as well as a power plant to fit the operating features of the application.

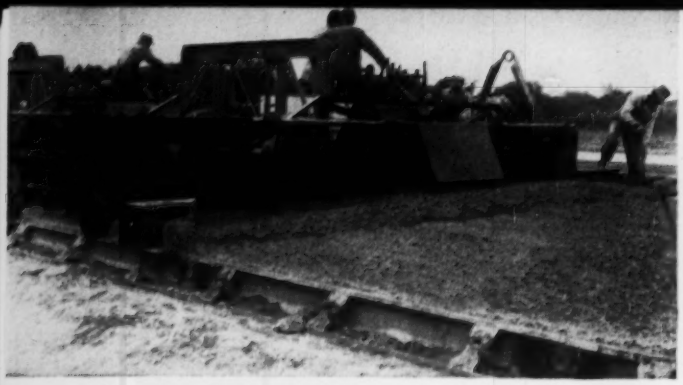
Then too, owners appreciate the dependable service and "trouble-free" operation of Hercules Engines. They know that with routine maintenance, their Hercules powered equipment will give them years of "top-notch" performance.

With the addition of the recently announced G.O. Series (Gasoline Overhead Valve) and the D.D. Series (Direct Injection Diesel), Hercules customers have an even greater selection of internal combustion engines and power units. More than 90 different models are available from 3 to 500 H.P. for operation on natural gas, gasoline or diesel fuel.

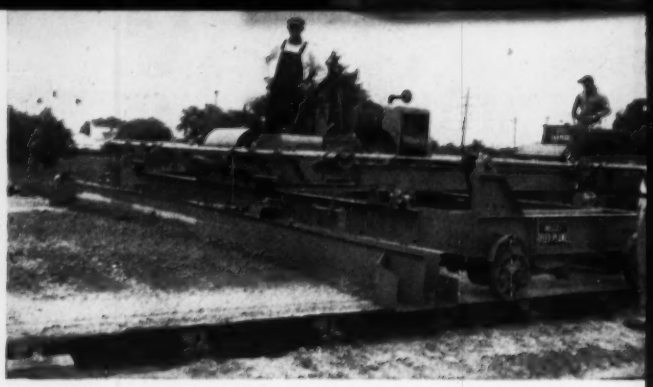
Hercules Sales-engineers will be glad to assist you in solving your particular power problems. Drop us a letter, we'd be most happy to work with you—of course, there's no obligation.

All Types of Dependable Power

HERCULES MOTORS CORPORATION, Canton, Ohio



Two Flex-Plane Finishers used in tandom by A. J. Baltes Construction Co., on section of Ohio Turnpike



Western Contracting Co. operated two more on still another section of Ohio pike.

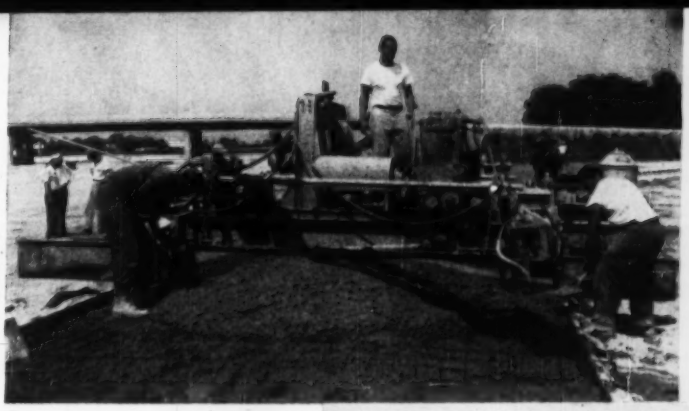
FLEX-PLANE

J. C. O'Connor and Sons operate Self-Widening Flex-Plane on section of Indiana Turnpike.

J. A. Tobin uses Flex-Plane working low slump concrete on section of U. S. 69 near Kansas City, Mo.

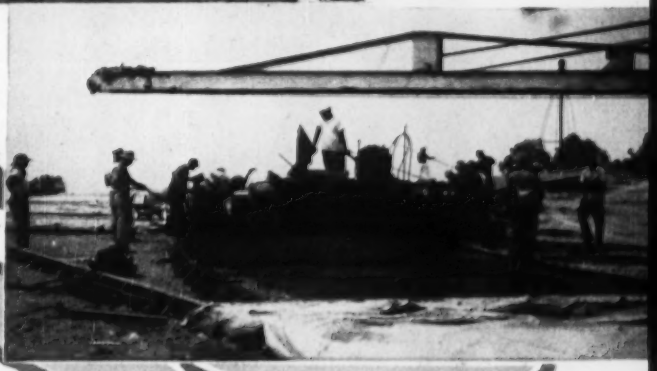
THE MULTIPAVE STEEL FORM AND TRACK — Heltzel — WARREN, O. — THE FLEXIBLE ROAD JOINT MACHINE COMPANY — Flex Plane — CONSTRUCTION EQUIPMENT — WARREN, OHIO

WORLD'S LARGEST BUILDER



Self-widening machine used by Peter Kiewit on a midwestern turnpike interchange.

The Flex-Plane machine takes gradework in stride. Here Harrison Construction Co. works cloverleaf with a self-widening unit.



.....the nation's most popular Finishing Machine

9892

Here's the finishing machine that has outsold all others for the past two years. The Flex-Plane has been the most flexible machine of its type ever built . . . and the 1956 model is no exception.

Upon a sturdy triple-lap frame, that extends hydraulically at the flick of a finger, is a power-packed engine that will easily handle the toughest finishing jobs. Users often work them without spreaders.

There is the Flex-Plane originated hydraulic transportation rig that transforms the machine into its own trailer in a matter of seconds. And, the Flex-Plane Self-Widening feature, that proved so popular last year, has been improved for 1956.

Add to these outstanding features the new Flex-Plane screed that holds rigid and true under any condition, yet takes a crown speedily, with a minimum of down time. Remember, too, Flex-Plane screeds are outside the frame where they belong for easy maintenance and better finishing.

Again we say, look them all over, talk to users, and we're sure you, like dozens of other leading contractors, will specify Flex-Plane Finishers from this point on.

THE FLEXIBLE ROAD JOINT MACHINE COMPANY
7000 Thomas Road — Warren, Ohio

While working turnpike Calumet Construction Co. found Flex-Plane flexibility paid dividends.

On Garden State Parkway the Weldon Construction Co. put their second Flex-Plane through its paces.

The Union Building and Construction Corporation uses a pair of Flex-Planes to finish slabwork on Indiana Turnpike.

OF CONCRETE FINISHING EQUIPMENT

Bids Asked—Low Bidders—Contracts Awarded—First Section—

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager
J. A. MAHONEY, M. WETZEL, L. M. FELIX, M. E. SCIORRA, F. S. DEMBEK, Reports.
J. H. WEBBER, M. R. ROESSLER, E. R. HUBER, Statistics.

NEW ENGLAND

BUILDINGS—BA

▲ R. I., Coventry—HIGH SCHOOL—BA 4/19—Town, Henry J. Cooper, supt. Schools, High School, Hope Rd., high school, Anthony Rd. $1,250,000. Plans deposit $100. Extended date. Gardiner & Mather, 170 Westminster St., Providence, archts. CD 3/6.

BUILDINGS—SLC

Conn., Enfield—SHOPPING CENTER—Allan Heffin, c/o Walter J. Douglas Assocs., 1005 Farmington Ave., West Hartford, soon lets contract shopping center, Enfield St. $800,000. CD 3/21.

BUILDINGS—LB & CA

▲ Harvey Constr. Co., Inc., 450 Valley St., Manchester, N. H., CA, $1,066,785, JUNIOR HIGH SCHOOL, South and Cypress Sts., CONCORD, N. H. Concord Union School Dist., Concord, N. H. Bids Mar. 23. CD 3/29, under LB.

Morris & Son Constr. Co., 219 Central St., Lowell, Mass., LB $808,673, est. $800,000. Elementary SCHOOL, TEWKSBURY, MASS. Town, School Dpt., North St. School, Tewksbury, Mass. Bids Mar. 23. CD 2/27.

▲ F. Grande & Son, Inc., 175 Maplewood St., Malden, Mass., CA $2,051,881, est. $2,000,000. Regional HIGH SCHOOL, WRENTHAM, MASS. Towns Wrentham, Norfolk and Plainville, King Philip Dist. Regional School Dist., Municipal Bldg., Wrentham, Mass. CD 3/15, under LB.

▲ Ames Constr. Co., 15 Standish St., Hartford, Conn., CA, $1,275,920, est. $1,250,000. JUNIOR HIGH SCHOOL, North High St., Route 100, EAST HAVEN, CONN. Town School Dpt., Town Hall, East Haven, Conn. Bids Mar. 12. CD 3/15, under LB.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

▲† New York—BA 5/1—U. S. Eng., Niagara and Bridge Sts., Buffalo, flood control proj., Wellsville, Allegany Co. $1,500,000. Plans deposit $25.

BUILDINGS—BA

▲† N. Y., Brookhaven—MEDICAL RESEARCH CENTER—BA 5/1—Atomic Energy Comn., 1901 Constitution Ave. N. W., Wash., D. C., Medical Research Center at Brookhaven National Laboratory, $6,000,000. Plans deposit $50. Eggers & Higgins, 100 E. 42 St., New York, archts. Weiskupf & Pickworth, 2 W. 45 St., New York, struct. engrs. Syska & Hennessy, Inc., 144 E. 39 St., New York, mech. engrs. CD 2/28.

▲† Md., Germantown—HEADQUARTERS—BA 5/3—Atomic Energy Comn., in office John A. Derry, dir. Constr., 1717 H St. N. W., Wash., D. C., AEC headquarters, $10,000,000, incl. land. Plans deposit $100. Voorhees, Walker, Smith & Smith, 101 Park Ave., New York 17, N. Y., archts. CD 8/2.

HEAVY CONSTRUCTION—LB & CA

▲ L. E. Meyers Co., 53 W. Jackson Blvd., Chicago, Ill., CA Est. $2,632,000. 49 mi. high voltage power line into Erie Co. from Perry, power generated at Lake Seneca and Lake Cayuga, Erie and Wyoming Counties, NEW YORK; New York State Electric & Gas Corp., 62 Henry St., Binghamton, N. Y. CD 12/13.

▲† J. A. Jones Constr. Co., 209 W. Fourth St., Charlotte, N. C. and Charles H. Tompkins Co., 907 16 St. N. W., Wash., D. C. LB $8,622,849. constr. Hildebrand Lock and Dam Proj. on Monongahela River, PENNSYLVANIA and WEST VIRGINIA. U. S. Eng., 925 New Federal Bldg., Pittsburgh 19, Pa. Bids Mar. 27. CD 8/18.

▲ Joseph F. Hughes & Co., Inc., 5 E. Franklin St., Baltimore, Md. LB $1,806,053. Contr. PT-123, constr. toll plaza admin., maintenance bldg., and services area, Baltimore, part of Patapsco Tunnel Proj., MARYLAND. State Rds. Comn., 108 E. Lexington St., Baltimore 2, Md. Bids Mar. 29. CD 3/8.

BUILDINGS—LB & CA

▲ Edward J. Fuhrmann Co., Inc., 141 Lein Rd., West Seneca, N. Y. CA Est. $1,000,000. SHOPPING CENTER, 1st unit 125x256 ft. department store, 150,000 ft. to house 3 addnl. stores, DEPEW, N. Y. Twin Fair, Inc., John J. Nasca, secy., Waldbridge Bldg., Buffalo, N. Y. Awarded Mar. 1.

▲ J. D. Taylor Constr. Corp., 406 N. Midler Ave., Syracuse, N. Y. CA Est. $1,000,000. 320x400 ft., WAREHOUSE, STORAGE and SERVICE, 19 ft. high, SYRACUSE, N. Y. Crouse Hinds Co., Wolf St., Syracuse, N. Y. Edgar G. White, co. proj. engr.

▲ Thomas Constr. Co., 165 Holden Ave., Paterson, N. J. CA $1,066,590. general contract SCHOOL, FAIRLAWN, N. J. Bd. Educ., 7-06 Fairlawn Ave., Fairlawn, N. J. CD 3/12, under LB.

▲ Severn River Constr. Co., 2 W. University Parkway, Baltimore 18, Md. Owner Builds. $1,200,000. one hundred and fifty 2 story brick RESIDENCES, Fifth Ave., LANSDOWNE, PA. A. S. Cochran, 925 N. Charles St., Baltimore 1, Md., archt.

SOUTH

HEAVY CONSTRUCTION—LB & CA

▲ Gust K. Newberg Constr. Co., 2040 N. Ashland St., Chicago, Ill. LB $4,647,000, est. $5,250,000 (6 bidders) Contr. 225, sewage disposal plant, LOUISVILLE, KY. Metropolitan Sewer Dist., 412 W. Market St., Louisville, Ky. Bids Mar. 27. CD 1/27.

BUILDINGS—LB & CA

Stanley Rakusin & Arthur P. Becker, 4916 Del Ray Ave., Bethesda, Md. Owner Builds. $750,000. SHOPPING CENTER, Columbia Pike and Dinwiddie St., ARLINGTON, VA. Arthur P. Becker, 4916 Del Ray Ave., Bethesda, Md., archt.

Gaines Constr. Co., 15450 N.W. 27 Ave., Opa Locka, Fla., CA, $900,000, 133 RESIDENCES, vicinity of N.W. 42 Ave. and 169 St., Carol City, MIAMI, FLA. No. 3 Holding Co., 15450 N.W. 27 Ave., Opa Locka, Fla.

▲ J. Y. Gooch, Inc., 1205 Congress Bldg., Miami, Fla. CA, $1,000,500. 5 story (alternately 20 story) 97x123 ft., brick facing OFFICE, 25 N. E. 2 St., MIAMI, FLA. Southern Bell Telephone & Telegraph Co., 36 N.E. 2 St., Miami, Fla. Armistead & Saggus, 739 W. Peachtree St., Atlanta, Ga., archts.-engrs.

▲† R. F. Ball Constr. Co., 1430 E. Houston St., San Antonio, Tex. LB $2,939,137. 200 family HOUSING UNITS, total 34 bldgs., Lake Charles Air Force Base, Inv. 56-45, LAKE CHARLES, LA. U. S. Eng., Box 1229, Galveston, Tex. Bids Mar. 28. CD 3/19.

Tudor Constr. Co., Alexandra, La. LB $718,600. (7 bidders) white female receiving unit for Central Louisiana State HOSPITAL; Proj. No. 1-5, PINEVILLE, LA. State Bldg. Auth., State Capitol, Baton Rouge, La.

Ross E. Cox, Box 1267, Baton Rouge, La. CA $629,366. Est. $600,000. 2 story brick, COURTHOUSE with JAIL covering part of third floor, PORT ALLEN, LA. West Baton Rouge Parish, Port Allen, La. Bids Mar. 15. CD 2/28.

▲ Southern Builders, Inc., Box 1815, Shreveport, La. CA $1,675,050. WAREHOUSE, OFFICE, STORE and GARAGE for Childs Food Stores, at Hollywood Ave., SHREVEPORT, LA. The Kroger Co., 35 E. Seventh St., Cincinnati, O. Hixson-Tarter & Assoc., 2320 Victory Parkway, Cincinnati, O., archts. Awarded Mar. 19. CD 1/26.

▲ Walter Kidde Constructors, Inc., 140 Cedar St., New York, N. Y. CA Est. $2,000,000-$3,000,000. expansion present PLANT (formerly Kentucky Synthetic Rubber Co.), on Camp Ground Rd., LOUISVILLE, KY. American Synthetic Rubber Corp., Camp Ground Rd., Louisville, Ky. Awarded Mar. 26.

▲ C. F. Braun & Co., 45 Rockefeller Plaza, New York, N. Y., LB $1,180,000, four pressure heaters for STEAM PLANT, MEMPHIS, TENN. Memphis Light, Gas & Water Comn., 2996 Ky. 61 S., Memphis, Tenn.

American Water Softener Co., S.E. cor. 4th and Lehigh Ave., Phila. 33, Pa., LB $176,928, install 4 low pressure heaters at steam plant (Memphis, Tenn.). Walk C. Jones, Jr., 1215 Poplar Ave., Memphis, Tenn., archt.

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $44,000; other public works $73,000; industrial buildings $93,000; other buildings $344,000. Also Foreign projects of $100,000 and more in size of interest to American contractors.

By Regions & Classes of Construction

(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED

New England	Middle West
Middle Atlantic	West of Mississippi
South	Far West

PROPOSED WORK

Water Supply	Public Buildings
Sewers, Waste Disposal	Mass Housing
Bridges	Commercial Buildings
Streets & Roads	Industrial Buildings
Earthwork, Waterways	Unclassified

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.
BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.

SOON LETS CONTRACT: SLC

LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.

CD dates shown are of Construction Daily issue in which last previous report was published.

OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.

Symbols and Abbreviations Include:

† Federal Government
▲ Project of $1,000,000 or over.
ENR Engineering News-Record
CD Construction Daily

For additional reports see Construction Daily.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

Ill., Watseka—BA 4/19—City, City Hall, sanitary sewers, sewage disposal plant, lift station. $550,000. Tracy A. Pitson, Paxton, engr. CD 10/2/45.

BUILDINGS—BA

▲ Ind., North Manchester—SCHOOL—BA 4/25—North Manchester-Chester Twp. School Bd. Holding Corp., North Manchester, Consolidated High School. $1,250,000. Everett I. Brown, Circle Tower, Indianapolis, archt.

BUILDINGS—SLC

Ill., Chicago—BAKERY—National Baking Co., 321 E. 26 St., soon lets contract 86,000 sq. ft. bakery $850,000. Peter Camburos, 105 W. Madison St., Zone 2, archt. CD 10/27.

HEAVY CONSTRUCTION—LB & CA

ILLINOIS—State Div. Hys., Centennial Bldg. Springfield, Jesse H. Freeman, Inc., 1608½ 5 Ave., Moline, Ill., CA $550,974, c. conc. 3.58 mi. FA Route 7, Whiteside Co. Bids Mar. 9. CD 3/14, under LB.

▲ WISCONSIN—State Hy. Comn., State Hy. Office Bldg., Madison, Wis.—Fay Hammersley Jr., R 2, Madison, Wis., LB $272,244, Contract 1, grading, ballast, base, structure 5.198 mi. C.T. Hy. "M", Proj. S 0642 (3), Dane Co.;

Wis.—Robert W. Ryan Co., Janesville, Wis., LB $599,812 Contract 1, grading, ballast, base, structure 5.255 mi. S. T. Hy. 81, Proj. S 031 3 (2), Monroe Co.;

Wis.—Vinton Constr. Co., 924 S. 8 St., Manitowoc, Wis., LB $952,024. Contract 1, base, c. conc. 0.128 mi. U. S. Hys. 141 and 151, S.T.H. 42, F-01-4 (29) addn. F 035-2 (7) and F 035-2 (9) Manitowoc Co.;

Wis.—Bushman Constr. Co., 4635 Wyandotte St., Kansas City, Mo., LB $215,245, Contract 1, base, c. conc. 1.328 mi. S.T. Hy. 73, Proj. T 0348 (2), Clark Co.;

Wis.—Rasmussen Constr. Co., 914 Oregon St., Oshkosh, Wis., LB $256,487, Contract 1, b. conc. 7.486 mi. S.T. Hy. 175, Proj. 0979 (7) Fond du Lac Co.;

Wis.—Reliance Constr. Co., 1011 S. 8 St., Sheboygan, Wis., LB $313,971, Contract 1, b. conc. 11.004 mi. S.T. Hy. 175, Proj. T 0979 (8) Washington Co.;

Wis.—Edward Kraemer & Sons, Plain, Wis., LB $162,425 Contract 1, b. conc. 4.997 mi. U.S. Hy. 14, Proj. T 08-2 (13) and T 08-2 (14) LaCrosse and Vernon Counties;

Wis.—Sarrington Milling Co., Lake Delton, Wis., LB $211,585, Contract 1, base, aggreg. bit. 6.83 mi. U. S. Hy. 8 and S.T. Hy. 32 and 55, Pron S 0231 (3) T 021-3 (6), and T 0231 (6), Forest Co.;

Wis.—H. Turner & Son, Boscobel, Wis., LB $181,792. Contract 1, bit. 14.383 mi. S.T. Hy. 131 and 60, Proj. T 0193 (5) and T 0196 (1), Crawford Co.;

Wis.—Arthur Overgaard Co., Elroy, Wis., LB $117,990 grav. or crushed stone base course 11 mi. A.F.E. No. 29-611, Juneau Co.; LB $103,136, grav. or crushed stone base 8.5 mi. A.F.E. 41-612 Monroe Co., and A.F.E. 41-614, Monroe Co.;

Wis.—Otto Wiesner, Inc., & Otto Wiesner, Superior, Wis., LB $117,820. grav. or crushed stone base 11.8 mi. A.F.E. No. 2-611 and 4-611, Ashland and Bayfield Counties. Bids Mar. 27. CD 3/9.

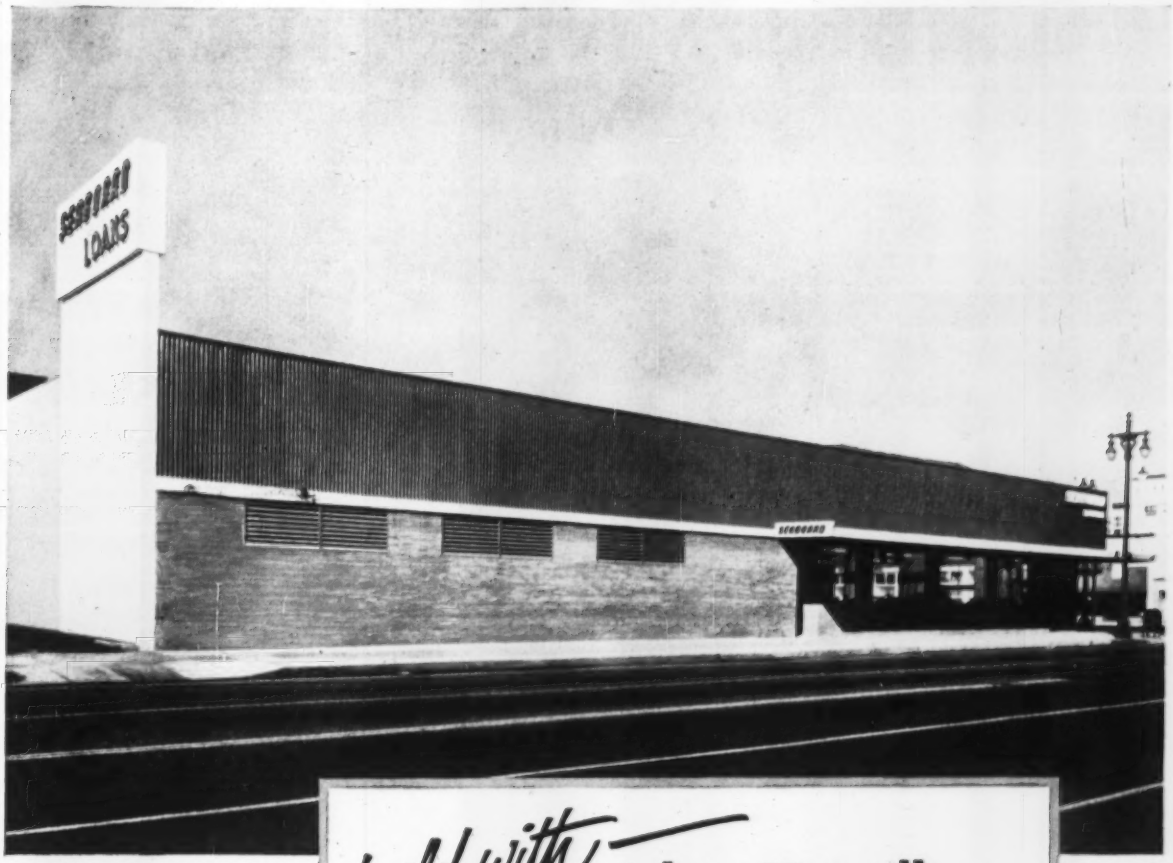
▲ MICHIGAN—State Hy. Dpt., Stevens T. Mason Bldg., Lansing,

Mich.—Hertel-Deyo Co., 5205 Division St., Grand Rapids, Mich. LB $999,245, est. $1,120,000. (8 bidders) c. conc. 4.033 mi. US-31, 44 ft. wide with curb and gutter, part dual concrete with 4 ft. separation, each side 22 ft. wide, on US-31 from Traverse City to Four Mile Rd., F 28-1 C3-U, F 28-1 C4-R (F 18 7) Grand Traverse Co.;

Mich.—Shabluck Trucking Co., Saginaw, Mich. LB $325,817, est. $400,000. (16 bidders) stabilized aggregate surf. 5.97 mi. M-72 5 mi. east of M-65 and Easterly, FH 1-3 C2-R (FH 7 8), Alcona Co.;

(Continued on page 86)

No costly maintenance problem here



In addition to its clean, trim appearance . . . Johns-Manville Corrugated Transite offers years of low-maintenance service and fire safety to Seaboard Finance Company's new Los Angeles office.

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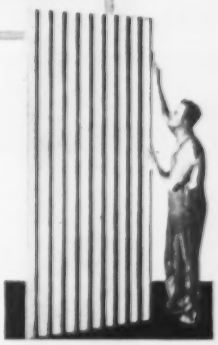
For maintenance-free exterior walls and roofs, plus protection from fire, rot and weather

YOU SAVE MONEY on construction and maintenance when you build with Johns-Manville Corrugated Transite®. Corrugated Transite comes in large sheets that require a minimum of framing . . . permit fast, economical construction of industrial, commercial, institutional and agricultural buildings.

Made of asbestos and cement, Corrugated Transite is practically indestructible. It never needs paint or special treatment to preserve it . . . it's fireproof and rotproof. Corrugated Transite is also used increasingly for interiors. The streamlined corrugations and attractive shadow lines offer interesting design possibilities.

Investigate Johns-Manville Corrugated Asbestos Transite and learn how you can build quickly and easily . . . have an attractive, long-lasting, trouble-free structure regardless of size or purpose. For complete details, write Johns-Manville, Box 158, Dept. FN, New York 16, New York. In Canada write 565 Lakeshore Road East, Port Credit, Ontario.



- Large sheets go up quickly
- Easy to fasten to steel
- Easy to nail to wood
- Easy to saw
- Easy to drill

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Johns-Manville

The man behind the gun will tell you . . .

WHITE GIVES YOU greater, longer-lasting precision–

Shown, model 7014 with "A" standard. Sold complete with tripod case and field equipment. Model 7014, same unit with "U" standard, also available.

. . . yet costs less than other quality engineers' transits

LIKE every White quality-built instrument, these engineers' transits give you greater dollar-for-dollar value than any other comparable unit.

For example: White uses a recently-developed Swiss Dividing Engine to cut graduations into solid silver. This insures super-precision from the beginning, safeguards it through more years of hard field usage.

In addition, White engineers' transits give you internal focusing, covered leveling screws, and coated optics. These and a host of other design and operating features combine to give you a transit unsurpassed for ease, speed, accuracy, economy and long-lived dependability. Write for Bulletin 456 and the name of your nearest dealer. DAVID WHITE COMPANY, 317 W. Court Street, Milwaukee 12, Wisconsin.

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not this

Even at long distances under adverse weather conditions, you get a clear, sharp image — without halation.

DAVID WHITE COMPANY

We offer expert REPAIR SERVICE on all makes, all types of instruments.

(Continued from page 84)

Mich.—**Walton Constr. Co.**, Kingsley, Mich. LB $135,339, est. $140,000. (7 bidders) aggregate surf. course 6.219 mi. Black Lake Rd., CS 6-26 C2 (S 519 2), CS 16-41 C1 (S 1329 1), Cheboygan Co.;

Mich.—**Sargent Constr. Co.**, 2840 Bay Rd., Saginaw, Mich. LB $1,053,280, est. $1,240,000. (12 bidders) c. conc. 4.919 mi. M-21 from M-13 east to Morrish Rd., F 25-27 C6-R (F 54 6), Genesee Co.;

Mich.—**Eisenhour Constr. Co.**, 1056 E. Grand River, East Lansing, Mich. LB $167,288, est. $160,000. (6 bidders) c. conc. 0.934 mi. US-27 and M-78 at intersection of entrance to Michigan State University, also incl. pave removal 0.014 mi. US-16, M 33-9 C20 U, U 33-13 C3-U0, etc., Ingham Co.;

Mich.—**Globe Constr. Co.**, Kalamazoo, Mich. LB $164,120, est. $170,000. (8 bidders) b. conc. 5.905 mi. M-43 from Nazeth Rd. to Richland Village and from south limits of village to M-89, SS 38-15 C9-R, SS 39-15 C10-U (S 207 3), Kalamazoo Co.;

Mich.—**General Paving Co.**, 235 Union Ave. S. E., Grand Rapids, Mich. LB $172,558, est. $160,000. (12 bidders) binder w/d'n., b. conc. surf. 7.565 mi. M-115 from Clare Co. line southwest, F 67-37 C9-R F 337 (16), Osceola Co.;

Mich.—**Max R. Frisinger**, 5804 W. Michigan St., Ann Arbor, Mich. LB $373,114, est. $340,000. c. conc. 2.53 mi. South Metropolitan Parkway south of Huron River Dr. and thence south, CS 82-231 C1 (S 791 2), WC 56-C1, Wayne Co.;

Mich.—**A. S. Leffler Gravel Co.**, Davison, Mich. LB $379,912. (17 bidders) aggregate surf. course 6.007 mi. M-55, F 65-22 C1-R (F 134 18), Ogemaw Co. Bids Mar. 21. CD 3/12 and 3/14.

Buesching Bros. Constr. Co., 219½ E. Berry St., Fort Wayne, Ind. CA $644,846, water plant addns., YPSILANTI, MICH. City, Betty Fenker, clk., Ypsilanti, Mich. Bids Mar. 12. CD 3/1.

BUILDINGS—LB & CA

▲ **Girdler Co.**, div. of National Cylinder Gas Co., 224 E. Broadway, Louisville, Ky., CA $8,000,000. expansion of facilities, incl. new BOILER PLANT, doubling production capacity of polyvinyl resins and plastic compounds, AVON LAKE, O. B. F. Goodrich Chemical Co., Rose Bldg., Cleveland, O.

▲ **The Austin Co.**, 16112 Euclid St., Cleveland, O. CA Est. $3,000,000. RESEARCH CENTER, comprising two bldgs., one 2 story 35,000 sq. ft. containing offices; other 1 story, 45,000 sq. ft. laboratory in Beachwood Village, CLEVELAND, O. Republic Steel Corp., Republic Bldg., Cleveland, O.

▲ **The Austin Co.**, 16112 Euclid Ave., Cleveland, O. CA $1,673,000. PLANT addns. incl. mould storage bldg., 3 furnaces, open hearth addns., pump house, locker bldgs., shop and office, EAST CHICAGO, IND. Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill. CD 11/11.

▲ **The Austin Co.**, 510 N. Dearborn St., Chicago 10, Ill., CA Est. $1,750,000. design and construct TRANSFORMER BLDG., TERRE HAUTE, IND. Allis-Chalmers Mfg. Co., P. O. Box 512, Milwaukee, Wis. CD 4/28/55.

Walsh Constr. Co., 140 N. Broadway, Chicago 2, Ill. LB $775,100, HIGH SCHOOL, GYMNASIUM, Crawford and Midlothian Rd., BLUE ISLAND, ILL. School Dist. 128, Sacramento and 127 Ave., Blue Island, Ill. Nicol & Nicol, 23 E. Jackson St., Chicago 4, Ill., archts. Bids Mar. 15.

Person Constr. Co., 130 N. Wells St., Chicago 6, Ill., LB $548,861, Jefferson SCHOOL, Garfield SCHOOL addn. and Garfield SCHOOL, CHICAGO HEIGHTS, ILL. School District 170, 1611 Averyen St., Chicago Heights, Ill. Wm. Nicolai, 112 Halsted St., Chicago Heights, Ill., archt. CD 9/9/53.

▲ **John P. McCann**, 1701 Grand Ave., Waukegan, Ill. Own Forces, $12,000,000. 800 HOMES, WAUKEGAN, ILL.

Miller-Davis Co., 1029 Portage St., Kalamazoo, Mich. LB $700,000. general constr. TRADE CENTER BLDG., Ferris Institute, BIG RAPIDS, MICH. State, A. N. Langius, dir. State Bldg. Dpt., Lewis Cass Bldg., Lansing, Mich. Bids Mar. 15. CD 2/24.

▲ **Babcock & Wilcox Co.**, 330 S. Main St., Akron, O. CA $748,983. generator for municipal POWER PLANT, ESCANABA, MICH. City, Escanaba, Mich. Grand total $1,940,493, CD 3/21.
Allis-Chalmers Mfg. Co., 1126 S. 70 St., Milwaukee, Wis. CA $949,750. turbine (Escanaba, Mich.);
St. Paul Foundry Co., 500 Como Ave., St. Paul, Minn. CA $241,760. structural steel (Escanaba, Mich.).

Bd. Educ., Kearsley Rural Agricultural School Dist. No. 14, Flint, Mich. rejected bids Mar. 20. high school North Genesee and Crosby, Kearsley, FLINT, MICH. LB $776,576. CD 2/24.

William M. Johnson Co., Flint, Mich. LB $655,820. general constr. Senior COLLEGE BLDG., FLINT, MICH. City, George D. Stevens, secy. Bd. Educ., Flint, Mich. Bids Mar. 15. CD 2/23.

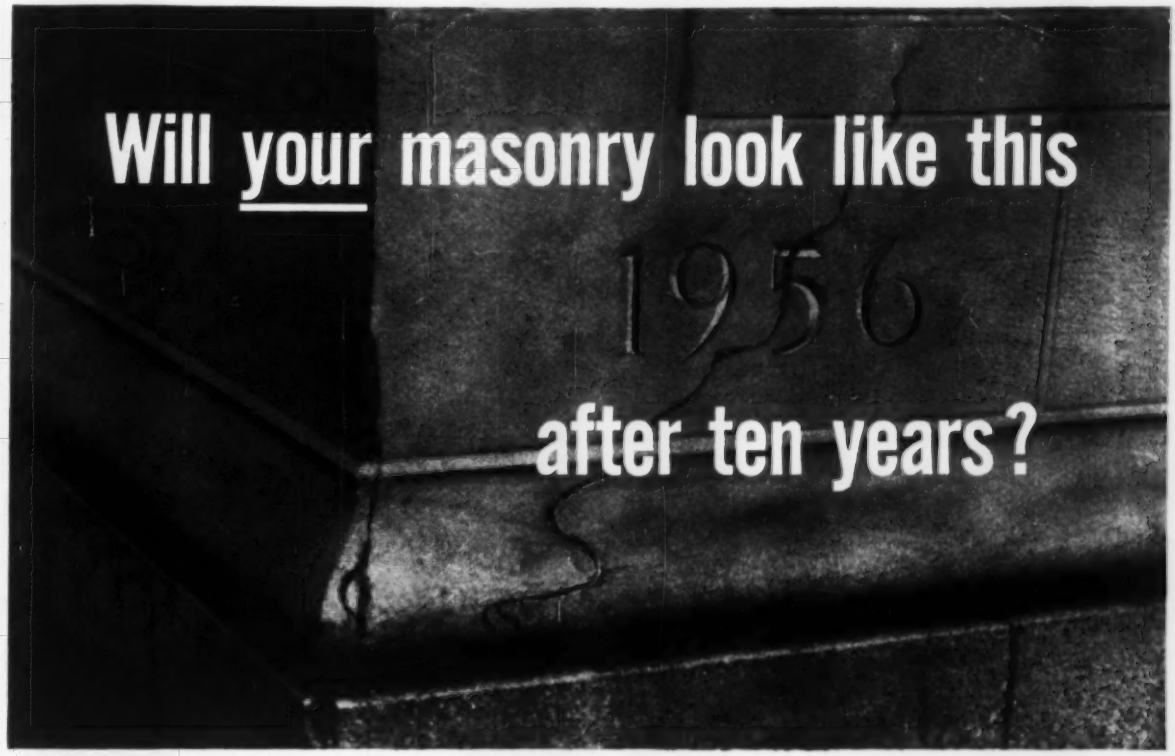
▲ **Spence Brothers**, 417 McCoskry St., Saginaw, Mich. CA Est. $1,500,000 general constr. Y.M.C.A. Bldg., SAGINAW, MICH. Young Men's Christian Assn., 200 N. Michigan St., Saginaw, Mich. Bids Dec. 28. CD 12/15.

WEST OF MISSISSIPPI

BUILDINGS—SLC

▲ **Minn., Twig**—SAFE AND POWER—Western Electric, Inc., Defense Proj. Div., 220 Church St., New York, N. Y., soon lets contract safe and power bldgs. on Hy. 53 near Twig, Spec. No. 1529. $2,000,000. Burns & Roe, 233 Broadway, New York, N. Y., archts.

(Continued on page 89)



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(Continued from page 86)

HEAVY CONSTRUCTION—LB & CA

General Electric Co., River Rd., Schenectady, N. Y. CA $609,040. 12,650-kw steam turbine, JONESBORO, ARK. City, Water & Light Plant, Jonesboro, Ark. Awarded Mar. 15.

▲ OKLAHOMA—Oklahoma Turnpike Auth., 400 N. Walnut St., Oklahoma City, Zone 4;

OTA—Broce Constr. Co., Woodward, Okla., CA $682,259, est. $625,000 (5 bidders) paving and incid. 4.359 mi. for Interchange 166, Miami, Ottawa Co.;

OTA—Lyles & Buckner, Commercial Natl. Bank, Muskogee, Okla., CA $763,593, est. $798,000 (4 bidders) paving and surf. 2.388 mi. at Miami Interchange, Contr. 171, Ottawa Co.; CA $365,647, est. $371,000 (6 bidders) Contr. 170, 0.956 mi. paving, surf. at Afton Interchange, Ottawa Co.;

OTA—Jack Briscoe, Stillwater, Okla., CA $1,109,682, est. $989,000 (5 bidders) Contr. 169, paving 3.431 mi. at Vinita Interchange, Craig Co.;

OTA—Ottinger Constr. Co., Camp Bowie Rd., Fort Worth, Tex., CA $571,147, est. $541,000 (3 bidders) Contr. 168, paving 1.079 mi. at Big Cabin Interchange, Craig Co.;

OTA—Boecking Constr. Co., 2810 N. McArthur St., Oklahoma City 7, Okla., CA $748,276, est. $655,000 (4 bidders) Contr. 167, paving 2.237 mi. at Claremore Interchange, Rogers Co. Grand total $4,240,604. Bids Mar. 27, awarded Mar. 28. CD 8/9.

▲ TEXAS—State Hy. Comn., Austin;

Tex—Austin Bridge Co. & Austin Rd. Co., P. O. Box 1590, Dallas, Tex., CA, $1,115,744 flex. base, c. conc. 3.53 mi. Hy. US 75 and SH 12, Proj. F 98 (8), etc. Collin Co.;

Tex—Jn. T. Leslie & W. L. Barnes, Contractor, Bailey, Tex., CA, $700,959 flex. base, b. conc. 7.044 mi. US 80, Proj. F 90 (9), Taylor Co.;

Tex—Heldenfels Bros., P. O. Box 1917, Corpus Christi, Tex., CA, $617,333, flex. base b. conc. 17.817 mi. Hy. US 81, Proj. F 548 (10) La Salle Co.;

Tex—Ernest Loyd, P. O. Box 1120, Fort Worth, Tex., CA, $978,670, flex. base, b. conc. 15.205 mi. US 66, Proj. FI 517 (5) etc., Carson Co.;

Tex—Gulf Bitulithic Co., P. O. Box 2572, Houston, Tex., CA, $631,517 flex. base, c. conc. and b. conc. 3.49 mi. Hy. SH 73, Proj. FI-1052 (9)I, Harris Co. Bids Mar. 20, awarded Mar. 28. Grand total $4,044,225. CD 3/26, under LB.

▲ TEXAS—State Hy. Comn., Austin;

Tex—Austin Bridge Co. & Worth Constr. Co., P. O. Box 1590, Dallas, Tex., CA, $1,219,095, flex. base, c. conc. 0.268 mi. Hy. SH 550 and US 81, UI-473 (5), Tarrant Co.;

Tex—Cage Bros. & T. C. Cage, 6959 San Pedro St., San Antonio, Tex., CA, $1,165,005 grading, structures, grade separation, flex. base, 2 crush. surf. tr. US 75, Proj. F 08 (9), Collin Co.;

Tex—Gilain & Terrill, Inc., P. O. Box 2268, Amarillo, Tex., CA, $542,392 flex. base, b. conc. 18.539 mi. Hy. SH 152, Proj. C 455 2 & 3 and 11 & 6, Carson and Gray Counties;

Tex—H. V. Caver, Inc., Atlanta, Tex., CA, $549,424, flex. base, crus. surf. tr. 10.768 mi. Hy. US 59, Proj. F 192 (8) Harrison Co. Bids Mar. 21, awarded Mar. 28. Grand total $3,475,916. CD 3/27, under LB.

▲ TEXAS—Texas Turnpike Auth., Austin;

Tecon Paving Co., 1201 Main St., Dallas, Tex., LB $2,131,699, grading, drainage 3.707 mi. from Chalk Hill Rd. to Sylva Ave.; Proj. D FW-42 Dallas Co. Bids Mar. 27. CD 3/20.

Lone Star Gas Co., 301 S. Harwood St., Dallas, Tex. Own Forces. $500,000. gas service lines, various parts of city, DALLAS, TEX. CD 2/23.

▲ City P. Service Bd., Villita and Navarro Sts., San Antonio, Tex. Own Forces. $500,000. electric distribution transformers installations, $500,000 new gas lines running to new subdivision, SAN ANTONIO, Tex. CD 1/25.

▲† Riedesel-Lowe Co., 501 E. 15 St., Cheyenne, Wyo., LB $1,550,591 Sch. I; LB $1,282,719 Sch. IA; airmen's dormitories and dining hall, F. E. Warren Air Force Base, Inv. 25-066-56-75, CHEYENNE, WYO. U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids Mar. 28. CD 3/8.

▲ NEW MEXICO—State Hy. Dpt., Capitol Bldg., Santa Fe;

N. M.—Brown Contg. Co., 3525 4 St. N. W., Albuquerque, N. M. CA $684,224 (3 bidders) Las Cruces-Northeast, Proj. F 018-1 (1), Dona Ana Co.;

N. M.—Armstrong & Armstrong, Roswell, N. M. CA $160,526. (3 bidders) Texico-North, Proj. S 1273 (1), Curry Co.;

N. M.—Longenbaugh & Coe, Inc., P.O. Box 6056, Albuquerque, N. M. CA $127,069. Quemado-Northerly, Proj. S 1300 (3), Catron Co.;

N. M.—Skousen Constr. Co., 208 Springer Bldg., Albuquerque, N. M. CA $105,611. (3 bidders) New Penitentiary to US 85 and SR 10, Proj. 2536 (200), Santa Fe Co. Grand total $1,077,430. Bids Mar. 23. CD 3/15.

BUILDINGS—LB & CA

▲ J. W. Bateson Constr. Co., 400 Gibraltar Life Bldg., Dallas, Tex. CA $6,035,994 construct and finance HOUSING, Whiteman Air Force Base, Inv. 23-028-56-49, KNOB NOSTER, MO. U. S. Eng., Federal Office Bldg., Kansas City, Mo. CD 1/31, under Mo., Sedalia.

▲ Arrow Constr. Co., Russell T. Schwartz, pres., 8131 Delmar Blvd., University City 24, Mo. Owner Builds. $1,500,000. 300 RESIDENCES, area south of old St. Charles Rock Rd. and west of Lindbergh Blvd., St. Louis County, PATTONVILLE, MO.

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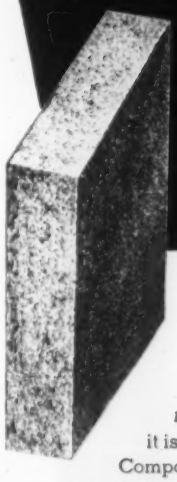

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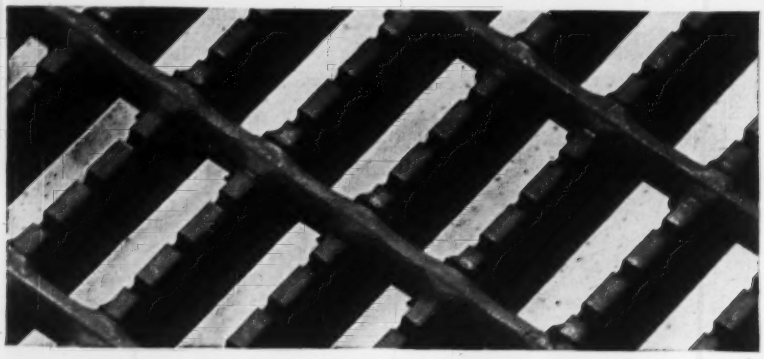

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▲ McDonald Constr. Co., 1310 S. Grand Blvd., St. Louis 4, Mo.; Frazier-Davis Constr. Co., 1319 Macklind Ave., St. Louis 10, Mo.; Massman Constr. Co., 111 N. Fourth St., St. Louis 2, Mo.; S. C. Sachs Co., Inc., Electrical Contractors, 5540 W. Park Ave., St. Louis 10, Mo.; Midwest Piping Co., Inc., 1450 S. Second St., St. Louis 4, Mo.; Wyatt & Kipper Engineers, Inc., 1310 S. Grand Blvd., St. Louis 4, Mo. (group bidders) CA Est. $40,000,000. rein.-con., steel bldgs. to house third section on Meramec PLANT near jct. Mississippi and Meramec Rivers at southeastern and St. Louis County, incl. also erection and installation all equip., auxiliaries and appurtenances for this 280,000 KW steam power generating plant, St. Louis County, ST. LOUIS, MO. Union Electric Co. of Missouri, 315 N. 12 Blvd., St. Louis 1, Mo. Bids Mar. 15. CD 1/13.

▲ Peter Kiewit Sons Co., 1024 Omaha Natl. Bank Bldg., Omaha, Neb., CA Est. $1,500,000. 13 story HOME OFFICE addn., OMAHA, NEB. Mutual Benefit Health & Accident Assn. and United Benefit Life Insurance Co., 3316 Farnam St., Omaha, Neb. CD 11/1.

FAR WEST

HEAVY CONSTRUCTION—BA

▲ Calif., Los Angeles—BA 4/25—City, City Hall, North Central Outfall Sewer, Unit 1, Section B to G (inclusive). $3,000,000. Hyperion Engineers (joint venture incl. Holmes & Narver Inc., 828 S. Figueroa St., Los Angeles; Daniel, Mann, Johnson & Mendenhall, 4201 Sunset Blvd., Los Angeles; Koebig & Koebig, 3142 Wilshire Blvd., Los Angeles, Calif.) engrs. CD 5/31.

BUILDINGS—BA

▲ Calif., San Francisco—CLARENDEN HALL—BA 4/25—City and San Francisco Co., Dpt. P. Wks., City Hall, reconstr. Clarendon Hall. $1,230,000. Plans deposit $100. Stone, Mulloy, Marraccini & Patterson, 619 California St., archts. CD 11/5/54.

▲ Calif., Los Angeles—HEATING PLANT, etc.—BA 5/16—Los Angeles Co., Hall of Records, central heating plant and distr. sys., Temple St. between Broadway and Hill St. $2,500,000. M. A. Nishkian & Co., 37-54 Long Beach Blvd., Long Beach, engr. CD 10/29/54.

HEAVY CONSTRUCTION—LB & CA

▲ OREGON and WASHINGTON—State Hy. Dpt., Salem, Ore. and Washington State Hy. Comm., Olympia, Wash. Guy F. Atkinson & Co., 10 W. Orange Ave. S., San Francisco, Calif. CA $6,681,840. Columbia River Interstate Bridge between Portland, Ore. and Vancouver, Wash. Bids Mar. 1. CD 3/5, under LB.

▲† General Constr. Co., 4850 N.W. Front St., Portland, Ore., CA $1,163,686, rock fill and hydraulic fill breakwater from Pitcher Point to Bayocean, Tillamook Co., CIVENG-35-026-56-161, OREGON. U. S. Eng., Pittock Block, Portland, Ore. Bids Mar. 20, awarded Mar. 27. CD 3/27, under LB.

▲ CALIFORNIA—State Div. Hys., 120 S. Spring St., Los Angeles,
Griffith Co., 1060 S. Broadway, Los Angeles, Calif. CA, $1,885,484. Riverside Freeway 2.2 mi., incl. 6 bridges and pumping plant, Riverside Co. Bids Mar. 22, awarded Mar. 30. CD 3/26, under LB.

Zarubica Co., 1350 N. Highland Ave., Los Angeles, Calif. LB $743,968, est $726,447 (10 bidders) Sch. 1, Unit 5, pipeline Districts Lower River Div. Ventura Co., CALIFORNIA. United Water Conservation Dist. of Ventura Co., 806 Railroad Ave., Santa Paula, Calif. Bids Mar. 15. CD 2/24;
Penn Co., 3932 Depot Ave., Baldwin Park, Calif. LB $69,151, est. $69,775 (5 bidders) Sch. 2, Unit 5, reservoir (California).

▲† Connolly-Pacific Co. & T. E. Connolly, Inc., 1925 Water St., Long Beach, Calif. LB $4,928,500. reconstr. North and South Breakwater, Redondo Beach, CIVENG-04-353-56-43, CALIFORNIA. U. S. Eng., 75 S. Figueroa St., Los Angeles, Calif. Bids Mar. 29. CD 3/12.

▲† Price-McNemar Constr. Co., 8601 Sepulveda Blvd. Sepulveda, Calif., CA $1,000,144 second Nike and facilities, Travis Air Force Base, Fairfield, Solano Co., CALIFORNIA. U. S. Eng., 1209 8 St., Sacramento, Calif. Bids Mar. 16, awarded Mar. 28. CD 3/23, under LB.

▲ Fairfield-Suisun Sewer Dist., 740 Texas St., Fairfield, Calif., rejected bids, sewage disposal plant, eastside of Suisun Slough, FAIRFIELD, CALIF. LB $1,388,488. Will re-advertise. CD 2/27, under LB.

▲ E. A. Irish, 2944 Gleneden St., Los Angeles, Calif. LB $1,889,156, est. $2,000,000 (6 bidders) Proj. 24, Michelinda Storm Drain, Arcadia, Pasadena, Sierra Madre, LOS ANGELES, CALIF. Los Angeles County Flood Control Dist., 2250 Alcazar St., Los Angeles, Calif. Bids Mar. 30. CD 3/12.

BUILDINGS—LB & CA

▲ Beusur Land Co., Inc., 1124 S. Beverly Dr., Los Angeles, Calif., CA, $1,250,000, 99 frame, stucco DWELLINGS, Gagely, Ramhurst, Corley Sts., BELLFLOWER, CALIF. Harcur Land Co., 1124 S. Beverly Dr., Los Angeles, Calif.

▲ Marvin Johnson, 5159 Cahuenga Blvd., North Hollywood, Calif., CA, $1,134,000, 90 frame, stucco DWELLINGS, Tract 2826; CA $1,348,200, 107 frame, stucco DWELLINGS, Lincoln and Holder Sts., Tract 2291, BUENA PARK, CALIF. Lincoln House & Garden, 261 N. Robertson Blvd., Beverly Hills, Calif.

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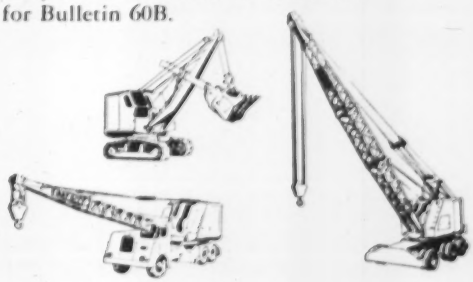

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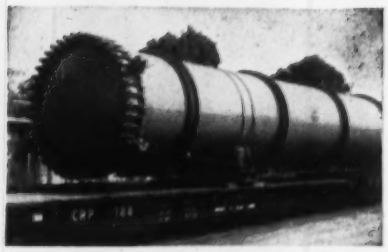

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▲ Cotton Constr. Co., Box 805, Chula Vista, Calif., LB $1,022,534 (3 bidders) Ben Hulse Elementary SCHOOL, addns. to HIGH SCHOOL, Frank Wright Intermediate School, IMPERIAL, CALIF. Imperial Valley High School Dist., Administration Bldg., Imperial, Calif. Bids Mar. 22.

Barrington & Botke, 1433 E. Main St., Santa Paula, Calif., CA, $803,300. Rim of the World SCHOOL addn., LAKE ARROWHEAD, CALIF. Rim of the World High School Dist., Lake Arrowhead, Calif. Bids Mar. 20, awarded Mar. 20. CD 2/27.

▲ C. L. Peck, 816 W. 5 St., Los Angeles, Calif. CA, $17,000,000. aircraft assembly PLANT and SERVICE BLDGS. at Long Beach Aircraft Assembly Plant C-8, LONG BEACH, Calif. Long Beach Div., Douglas Aircraft Co., Inc., 3855 Lakewood Blvd., Long Beach, Calif. CD 12/16.

▲† M. H. Golden Constr. Co., 3485 Noell St., San Diego, Calif., LB, $2,326,000. enlisted men's BARRACKS, 2nd increment, Naval Air Station, NOY 90856, Spec. 49534, MIRAMAR, CALIF. P. Wks. Office, Eleventh Naval Dist., 1220 Pacific Hy., San Diego, Calif. Bids Mar. 28. CD 3/14.

CANADA

HEAVY CONSTRUCTION—BA

▲ Ont., Petawawa—BA 4/17—Defence Constr. Ltd., 56 Lyon St., Ottawa, roadwork, landscaping, sewers and water mains, Army Camp. $2,000,000. Plans deposit $100. CD 12/15/54.

BUILDINGS—BA

Ont., London—BUSINESS ADMINISTRATION—BA 4/20—Bd. Governors University Western Ontario, Dr. E. Hall, pres., London, 3 story, bsmnt., 100x167 ft., business administration bldg. $750,000. Plans deposit $50. O. Roy Moore & Co., 260 Dundas St., archt. CD 1/4/55.

Que., Verdun—CITY HALL—BA 4/23—City, City Hall, 3 story, bsmnt., 125x175 ft., rein.-con. structural steel, stone, brick city hall. $950,000. J. Armand Dutrisac, 1069 Beatty Ave., archt. Rene Fortin, 3581 Northcliffe Ave., Montreal, engr. CD 2/9.

HEAVY CONSTRUCTION—LB & CA

▲ Bird Constr. Co., Ltd., 12525 127 Ave., Edmonton, Alta., LB Approx. $2,000,000 (11 bidders) main sewage treatment plant, EDMONTON, ALTA. City, City Hall, Edmonton, Alta. Bids Mar. 19. CD 2/27.

BUILDINGS—LB & CA

Bennett & White Alberta Ltd., 1120 9 Ave. W., Calgary, Alta., CA $751,421. 65,000 sq. ft., steel, masonry SERVICE BLDG. for ELECTRIC LIGHT DPT., CALGARY, ALTA. City, City Hall, Calgary, Alta. Awarded Mar. 16.

▲ Bird Constr. Co. Ltd., 1427 19 Ave. E., Calgary, Alta., CA, $1,403,935. 8 story, bsmnt. rein.-con., brick NURSES' RESIDENCE, CALGARY, ALTA. Holy Cross Hospital, School of Nursing, 2 St. W., Calgary, Alta. Bids Feb. 9, awarded Mar. 19. CD 1/30.

Smith Bros. & Wilson Ltd., 1267 Richards St., Vancouver, B. C., CA $900,000. 2 story prestressed concrete block NATURAL GAS DISTRIBUTION CENTER, Lougheed and Boundary Sts., BURNABY, B. C. B. C. Electric Co. Ltd., 425 Carrall St., Vancouver, B. C. B. C. Eng. Co. Ltd., 117 W. Pender St., Vancouver, B. C., engrs. Awarded Mar. 20.

▲ Luney Bros. & Hamilton Ltd., 825 Bay St., Victoria, B. C., LB Approx. $1,055,933 (4 bidders) converting post office into CUSTOM and IMMIGRATION OFFICES, VICTORIA, B. C. Dpt. P. Wks., Hunter Bldg., Ottawa, Ont. Bids Mar. 21. CD 2/21.

▲ Cosmos Constr. (Canada) Ltd., Suite 303, 1434 St. Catherine St. W., Montreal, Que., CA Est. $1,000,000. 11 story, penthouse, 2-level bsmnt., 80x105 ft. rein.-con. frame, brick APARTMENT, MONTREAL, QUE. Leicester Investments Corp., 1434 St. Catherine St. W., Montreal, Que. Deslauriers & Mercier, 1396 St. Catherine St. W., Toronto, Ont., engrs. CD 3/22.

▲ Carter Constr. Co., Ltd., 419 Cherry St., Toronto, Ont., CA Approx. $2,000,000, GRAIN ELEVATOR expansion at Harbor, THREE RIVERS, QUE. Three Rivers Grain & Elevator Co. Ltd., R. H. Boutet, secy., Three Rivers, Que. C. D. Howe Co., Ltd., 2421 Atwater Ave., Montreal, Que., engr.

ALASKA

† Alaska, Nome—POST OFFICE, etc.—BA 5/8—P. Bldgs. Service, General Services Admin., 19th and F Sts. N.W., Wash. 25, D. C., 2 story bsmnt. penthouse, 333,500 cu. ft. United States Post Office and Court House, Appr. No. 47X1143, Proj. No. 50-502. CD 11/18/53.

BUILDINGS—LB & CA

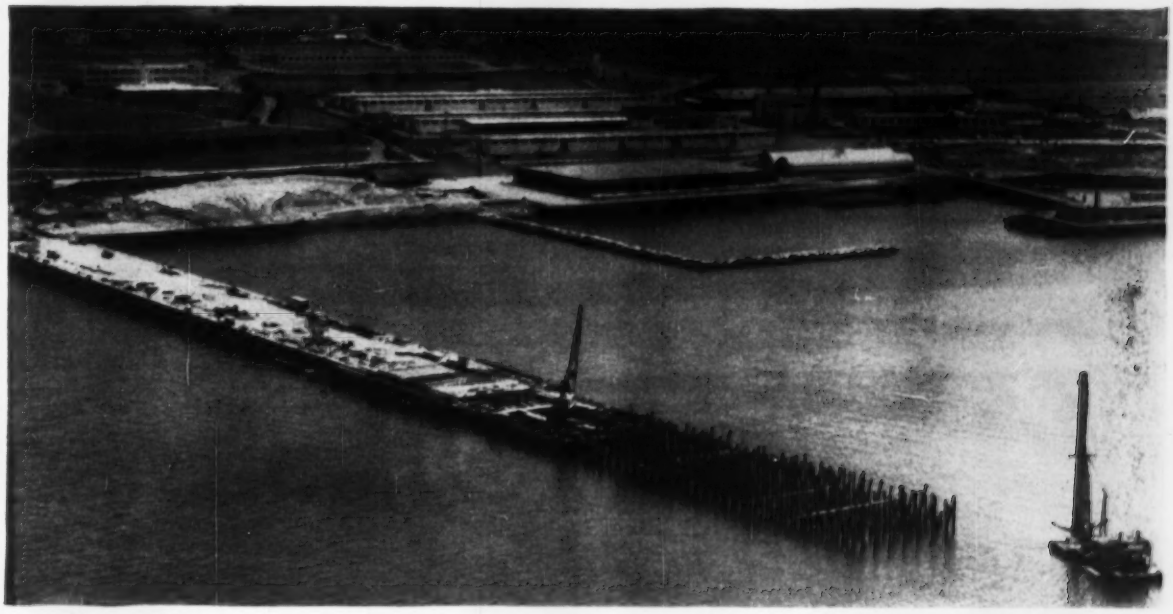
▲† Raber & Kief, 420 Queen Anne Ave., Seattle, Wash. LB $2,698,950, (2 bidders) FAMILY HOUSING and DIRECTION FINDER STATION, Spec. 2404/56, ADAK, ALASKA: P. Wks. Officer, 17th Naval Dist., 215 W. Harrison St., Seattle, Wash. Bids Mar. 28. CD 3/21.

FOREIGN

HEAVY CONSTRUCTION—LB & CA

▲ Richard Costain, Ltd., CA $9,800,000, housing, services, etc. at Kariba Dam, SOUTHERN RHODESIA, AFRICA. Federal Hydro-Electric Bd., 1 Park St., Salisbury, Southern Rhodesia, Africa; Messrs. A. G. Burton, Ltd., East Africa, CA $2,184,000, constr. 42 mi. gravel surf. hy. for North Access Rd. (Southern Rhodesia, Africa).

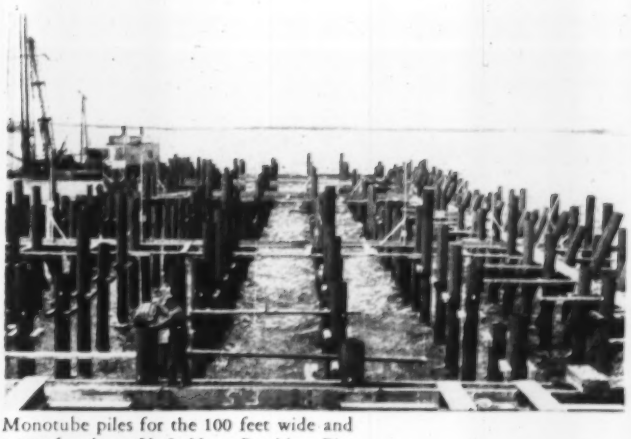
(Continued on page 94)



Monotube Piles provide

STABILITY

for new Navy Berthing Pier



Monotube piles for the 100 feet wide and 1,350 feet long U. S. Navy Berthing Pier at Newport, R. I.

PILE DATA

TYPE—MONOTUBE

DIAMETER—16 INCH

GAGE—3

NUMBER OF PILES—1638

LENGTH—50 TO 110 FEET

LOADING—50 TONS

DISTANCE FROM MUD LINE TO PILE CUT-OFF } APPROX. 30 FEET

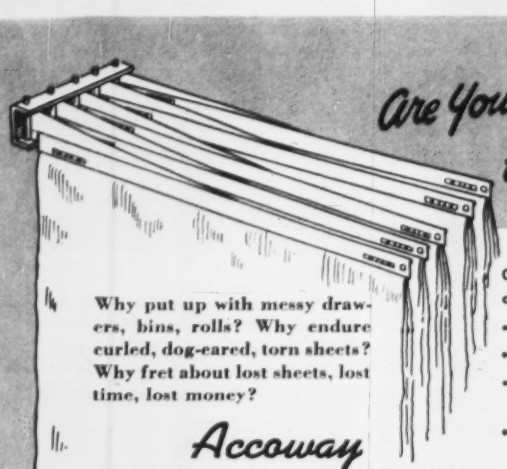
DESIGN: BUREAU OF YARDS & DOCKS, U. S. NAVY

CONTRACTOR: RAYMOND CONCRETE PILE COMPANY

50 FIFTIETH ANNIVERSARY 1906-1956

UNION METAL

Monotube Foundation Piles



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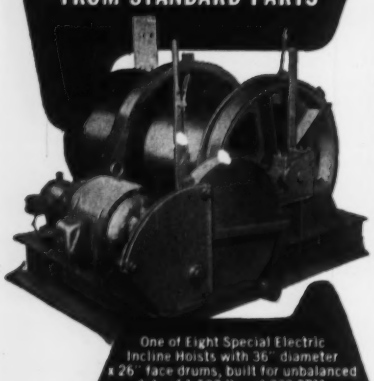

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(Continued from page 92)

PROPOSED PROJECTS

WATER SUPPLY

▲ Tex., Austin—City, City Hall, WW, $4,000,000. CD 2/10/54.

SEWERS, WASTE DISPOSAL

▲ Ark., Little Rock—Little Rock Sanitary Sewer Comm. of Pulaski Co., Court House, Little Rock, 18 m.g.d. sewage treatment plant, 8- to 60-in. trunk lines. $4,000,000.

▲ W. Va., South Charleston—South Charleston Sewage Treatment Co., Carbide & Carbon Chemicals Co., 437 MacCorkle Ave. S.W., South Charleston, sewage plant. $2,000,000. CD 8/16/54.

STREETS AND ROADS

▲ OHIO—State Hy. Dpt., Columbus, Zone 15,
Summit Co.—leg of Akron Expressway from South St. interchange to Rte. 224 (Waterloo Rd.), Akron. Howard, Needles, Tammen & Bergendoff, 55 Liberty St., New York, N. Y., consult. engrs.
Trumbull Co.—removal of Erie R. R. tracks from South St. and widen it to 6 lanes, Warren, $18,000,000. Michael Baker, Jr., Baker Bldg., Rochester, Pa., consult. engr.

▲ Okla., Oklahoma City—City, City Hall, defeated $4,105,000 bonds Mar. 20, roads, W. W. Baker, city engr. CD 3/1.

▲ Tex., Austin—City, City Hall, street impvs., paving, $6,250,000.

EARTHWORK, WATERWAYS

▲ North Carolina—Carolina Aluminum Co., Badin, N. C. 1,255 ft. dam, with 9 mi. reservoir, power house with three 18,300 h.p. turbines direct-connected to 13,333 kw generators, known as the Tuckertown Development on Yadkin River. Stanley, Montgomery, Davidson and Rowan Counties. $13,800,000.

▲ Texas—Sabine River Auth. of Texas, c/o John W. Simmons, Orange, Iron Bridge Reservoir Dam on Sabine River $19,356,000; pump station at reservoir site, $1,639,000; 333.4 mi. long 72 in. diam. water pipe line to bring water to Dallas limits, $13,867,000; water purification, southeast edge city limits of Dallas, $4,528,000; misc. work for the project, $250,000, all foregoing near Van, Rains and Van Zandt Counties. Forrest & Cotton, 803 Praetorian Bldg., Dallas, consult. engrs. completed cost survey. CD 9/14/54.

AIRPORTS

▲ Okla., Oklahoma City—AIRPORT—City, City Hall, defeated $4,300,000 bonds Mar. 20, airport impvs. W. W. Baker, city engr. CD 3/1.

▲ Tex., Austin—AIRPORT—City, City Hall, airport work, $2,000,000. CD 2/21/55.

▲ Que., Dorval—HANGAR—Defence Constr. Ltd., 56 Lyon St., Ottawa, Ont., reconstr. Hangar No. 6 at Airport, $3,000,000. J. P. Carriere, c/o owner, engr. CD 9/15/54.

LATIN AMERICA

▲ N. W. I., Curacao, Willemstad—HOSPITAL—Netherlands Indies Govt., Willemstad, Curacao, plans by Ronald Senseman, 327 Carroll St. N.W., Wash., D. C., U.S.A., 300-bed hospital. $3,000,000.

▲ Paraguay, Asuncion—Corporation de Obras Sanitarias de Asuncion, Chile 430, Asuncion, plans 25 m.g.p.d. water treatment plant, 150 mi. pipe, 14,000 house connections for water supply from Paraguay River. Bids after June 1. Export-Import Bank has made loan. $7,000,000. Radar Engineering Co., Congress Bldg., Miami, Fla., U. S. A., consult. engr.

▲ San Salvador, El Salvador—HOTEL—Compania Hotelera Salvadorena, S.A., Mr. Fidel Romero Castro, mgr., 4 Calle Oriente No. 16, Despachos 508-509, San Salvador, plans hotel. $2,000,000. CD 11/2/50.

FOREIGN

▲ Iran—Iranian Plan Organization, c/o Govt. of Iran, Tehran, has selected Development & Resources Corp., 44 Wall St., New York, N. Y., U. S. A., survey the agricultural, engineering, industrial and mining resources of the Khuzistan Region, and proposed a long term development program. The owner has $875,000,000 available from oil revenues.

PUBLIC BUILDINGS

▲ Ark., Fayetteville—CLASSROOM, etc.—University of Arkansas, Fayetteville, 9 year program, classroom and office bldgs., $1,523,000; laboratory $1,420,000; special purpose bldg. and facilities, $11,831,090. CD 3/22/46.

▲ Calif., Artesia—JUNIOR COLLEGE—Excelsior Junior College Dist., Artesia, plans by Kistner, Wright & Wright, 816 W. 5 St., Los Angeles, Junior College campus. $6,000,000. CD 10/5.

▲ Calif., Los Angeles—JUNIOR COLLEGE—Bd. of Educ., 1425 S. San Pedro St., plans by Allison & Rible, 625 S. Westmoreland Ave., Los Angeles (on first phase and master plan) Los Angeles City Junior College (1st phase) classroom and women's gymnasium, $2,400,000, to go ahead 1957, (2nd phase) two academic bldgs., library addn., auditorium, administration-classroom, $4,000,000, and (3rd phase) 3 academic bldgs., student center $2,800,000. Total est. $10,000,000. CD 4/8/55.

(Continued on page 97)

These two Allis-Chalmers HD-16 Crawler Tractors, one pulling and one pushing a scraper, are both equipped with A-C Torque Converter Drive — which incorporates Twin Disc Torque Converter components.

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Torque converter drive offers *six profitable, proved* advantages applicable to *your* crawler tractors. 1. Three-stage design provides the highest engine output torque multiplication available — eliminating harmful, costly engine lugging and stalling. 2. Engines work up in the maximum efficiency range *all* the time, delivering *constant* high-horsepower output . . . *doing more work* than units equipped with mechanical drive. 3. Power is *automatically* matched to load demands, with gear-shifting minimized or eliminated — where mechanical transmissions must *stay* in the starting gear ratio, even after starting load resistance is reduced . . . operator efficiency is boosted. 4. Heavy load pick-up is smooth, even, without clutch slippage . . . better flotation is obtained. 5. Overloads, shock loads and vibrations are cushioned *out,* through *fluid* connection . . . providing longer tractor life with less maintenance. 6. Infinite variety of ratios are available to work with, permitting smooth, accurate control of loads and delicate "inching" under power.

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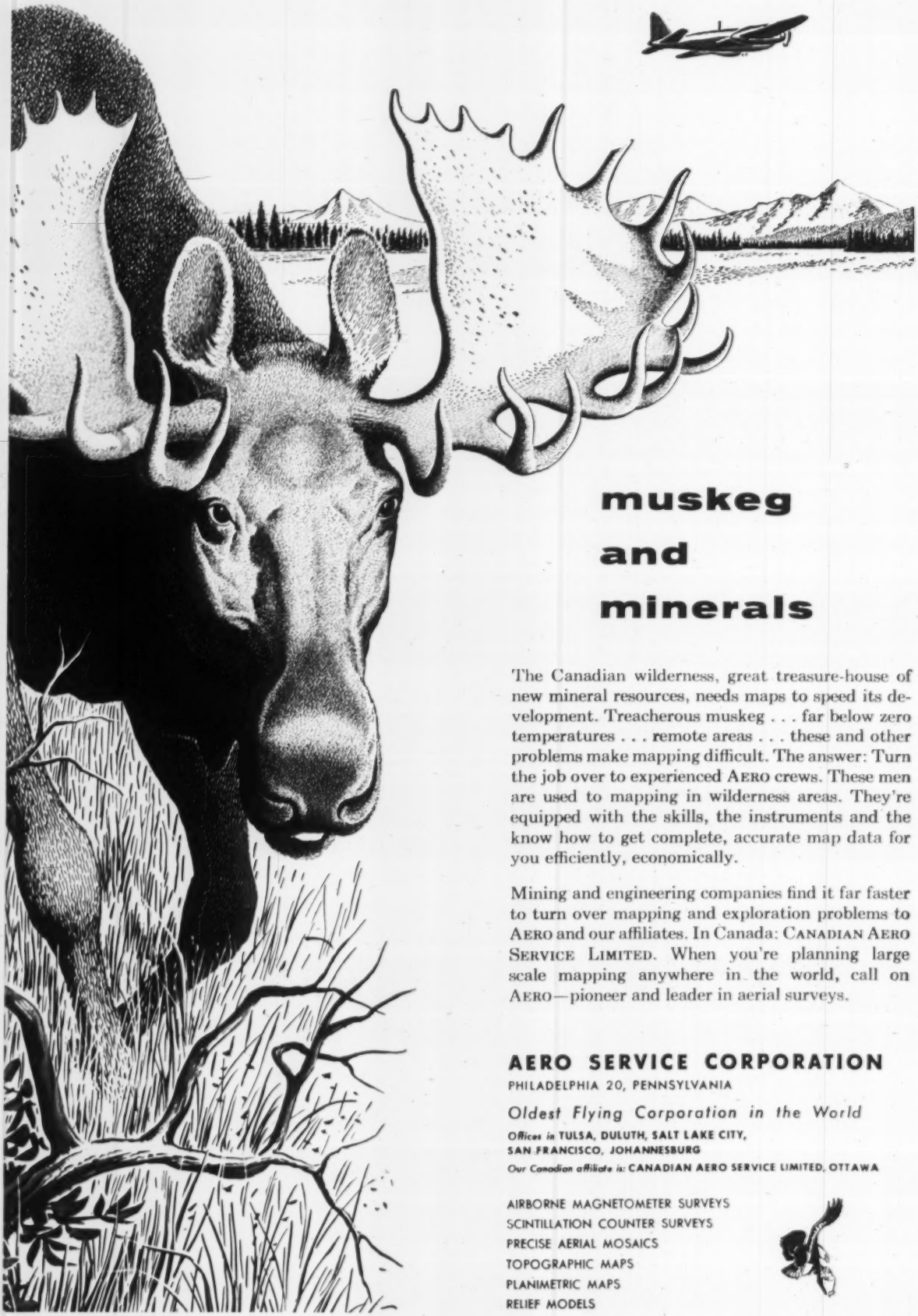

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RELIEF MODELS

(Continued from page 94)

▲ Calif., Los Angeles—SCHOOLS, etc.—Los Angeles Bd. Educ., 1425 S. San Pedro St., plans by Charmbers & Hibbard, 124 W. 4 St., classroom addn., Los Angeles Valley Junior College, Phase I Van Nuys, $3,094,000; plans by Ayers & Fiege, 4253 Coldwater Canyon, North Hollywood, classrooms at Vaughn St. School, Pacoima, 11500 Herrick St., $375,000; plans by Lee B. Kline, 1741 Silver Lake Blvd., Los Angeles, Vasili Ave. School, San Fernando Valley, Los Angeles, $450,000; plans by Walter L. Reichardt, 2305 Hyperion Blvd., Los Angeles, Gledhill St. School, San Fernando Valley, $375,000; plans by George V. Russell, 3275 Wilshire Blvd., Los Angeles, classrooms at Olertt St. School $375,000. CD 4/8/55.

▲ Calif., South San Francisco—SCHOOLS—South San Francisco Unified School Dist., South San Francisco, voted $800,000 bonds and application for $7,000,000 state loan for schools construction and remodeling.

▲ Conn., Bridgeport—REGIONAL TECHNICAL INSTITUTE—State P. Wks. Dpt., 165 Capitol Ave., Hartford, regional technical institute, $2,333,000. P. J. Carroll, c/o owner, engr.

▲ Conn., Danbury—INSTITUTE—State P. Wks. Dpt. 165 Capitol Ave., Hartford, Regional Technical Institute, $2,333,000. P. J. Carroll, c/o owner, engr.

▲ Conn., Fairfield—SCHOOLS—Town, Bd. Educ., Fairfield, high school $2,000,000; elementary school, North Stratfield, $1,205,000; elementary school, Center School District, $1,310,000; elementary school, Washington School Dist., $1,100,000.

▲ Conn., Meriden—INSTITUTE, etc.—State P. Wks. Dpt., 165 Capitol Ave., Hartford, Regional Technical Institute, $2,333,000; vocational school, $600,000. P. J. Carroll, c/o owner, engr.

▲ Conn., New Britain—HOME FOR AGED—State P. Wks. Dept., 165 Capitol Ave., Hartford, plans by Henry F. Lucorf, 95 Elm St., Hartford, home for aged and infirm $2,395,000. Hubbard, Lawless & Blakely, 110 Whitney St., New Haven, consult. engrs. CD 9/28/54.

▲ Conn., Norwalk—INSTITUTE—State P. Wks. Dpt., 165 Capitol Ave., Hartford, Regional Technical Institute, $2,340,000. P. J. Carroll, c/o owner, engr.

▲ Conn., Norwich—REGIONAL TECHNICAL INSTITUTE—State P. Wks. Dpt., 165 Capitol Ave., Hartford, regional technical institute, $2,340,000. P. J. Carroll, c/o owner, engr.

▲ Conn., Waterbury—INSTITUTE—State P. Wks. Dpt. 165 Capitol Ave., Hartford, Regional Technical Institute, $2,340,000. P. J. Carroll, c/o owner, engr.

▲ Ind., Frankfort—SCHOOLS—Bd. Educ., Frankfort, high school, converting present high school into junior high school $2,500,000.

▲† Maryland and Virginia—HOUSING—U. S. Eng., First and Douglas Sts. N. W., Wash. 25, D. C., plans by Mills, Petticord & Mills, 3308 14 St. N. W., Wash., D. C., 140 family housing units located at various Nike sites $1,000,000-$3,000,000.

▲† Md., Camp Detrick—ANIMAL BREEDING, etc.—U. S. Eng., First and Douglas St., N.W., Wash. 25, D. C., 2 animal breeding Bldgs., $100,000-$500,000; plans by Deigert & Yerkes, 1640 Wisc. Ave. N.W., Wash., D. C., constr. road, walks, parking, fencing and misc. bldgs., $1,000,000-$3,000,000. CD 3/6/56.

▲ Mich., Detroit—POST OFFICE—General Services Admin., Public Bldgs. Service, General Services Bldg., 19 and F Sts. N.W., Wash. 25, D. C., plans by Giffels & Vallet, Inc., L. Rossetti Associated Engineers & Architects, 1000 Marquette Bldg., 6 story (provision for 2 extra stories) post office, Fort, Jefferson, Eighth and Tenth Sts. $18,000,000-$20,000,000. Bids in six months. CD 12/5/49.

▲ Mich., Grand Rapids—HOSPITAL—State, Michigan Veterans Facility, 300 Monroe St. N. E., plans by Smith-Hinchman & Grylls, 800 Marquette Bldg., Detroit, hospital units, incl. geriatric unit, medical surgical unit, and Geriatric Hospital addn. $5,500,000. CD 6/27/51.

▲ Mich., Royal Oak—SCHOOL—Royal Oak Twp. Bd. Educ., Lamphere School Dist., 26337 John R Rd., voted $3,000,000 bonds, incl. Junior High School, 3 elementary schools. CD 2/10.

▲ N. J., Hackensack—ADMINISTRATION—Bd. Freeholders Bergen Co., Court House, plans by York & Sawyer, 101 Park Ave., New York 17, N. Y., Bergen County Administration bldg. and Court House addn. $4,000,000. To go ahead in Fall 1956.

▲ N. J., New Market—SCHOOL—Bd. Educ., Piscataway Twp., New Market, plans by John B. Richards, 111 E. Main St., Bound Brook, high school $2,000,000.

▲ N. M., Albuquerque—SCHOOLS—Bd. Educ., voted $1,300,000 bonds, 2 high schools, 3 gymnasiums, 2 junior high schools, 2 new mountain schools, addns. to several elementary schools, $5,492,500.

▲ Pa., Foxcroft—HOSPITAL—General State Auth., 18 and Herr Sts., Harrisburg, state mental hospital, Haverford Twp. $18,000,000. A. E. Jones, ch. engr. Site changed. CD 3/8/54, under Pa., Chadds Ford.

▲ Tex., Fort Worth—SCHOOLS—Fort Worth Independent School Dist., O. C. Armstrong, Bd. Pres., 1300 W. Lancaster St., bond election Apr. 7, new school bldgs., constr. addns. to existing school bldgs. $20,888,000. CD 7/16/52.

▲ Tex., Houston—HIGH SCHOOL—Houston Independent School Dist., 1300 Capitol St., plans by Emory S. White & Arnie G. Engberg, 666 M & M Bldg., and Stayton Nunn, 3272 Westheimer St., Sunnyside-Grimes area Junior High School. $2,225,000. R. L. Jenkins, 2622 Richmond St. and Walter P. Moore, 2 Pinedale St., consult. engrs. Bids in late Spring or early summer. CD 9/14/54.

▲ Utah, Fort Douglas—HOSPITAL—University of Utah, Dr. A. Ray Olpin, pres., University and 2 South, Salt Lake City, teaching hospital for University of

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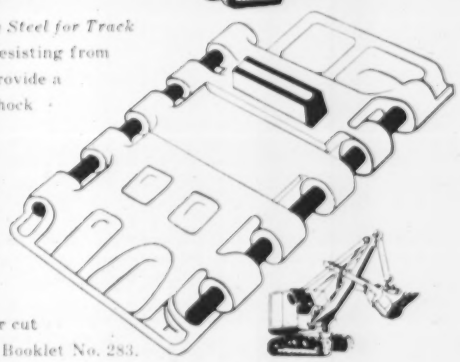

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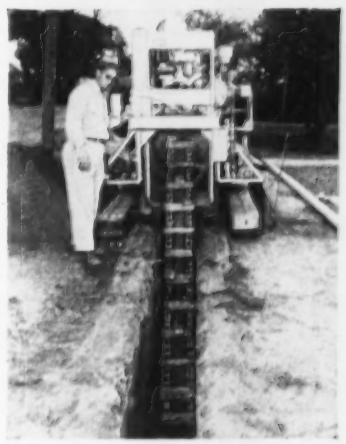

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Utah Medical School near present Cancer Research Center, $3,250,000. No appropriation.

▲ Utah, Ogden—SCHOOLS—Bd. Educ., 2352 Grant Ave., 4 schools. $2,500,000. CD 3/31.

▲ Sask., Regina—OFFICE—Saskatchewan Dpt. P. Wks., Parliament Bldgs., office for Sask. Power Corp. $4,000,000.

COMMERCIAL BUILDINGS

▲ Calif., Monterey—HOSPITAL—Peninsula Community Hospital, State Hy., Monterey, 100-bed hospital, 20-acre site, $3,000,000.

▲ Calif., Oakland—APARTMENT—Jacobsen Constr. Co., Box 954, Salt Lake City, Utah, plans by Confer & Willis, 366 40 St., 48-unit 13 story, reinforced con. apartment, Lakeside Dr. near 11 St. $2,500,000.

▲ Calif., Rialto—SHOPPING CENTER—Micamey, Inc. (G. and H. Meyer, North Eucalyptus Ave., Rialto, Vern L. Miller, 2201 Arrowhead St., San Bernardino, and R. V. Canaday of Rialto), plans by H. W. Underhill, 4314 Leimert Blvd. Los Angeles, North Rialto Shopping Center. $2,000,000. Bids in about a month.

▲ Calif., San Rafael—HOUSING DEVELOPMENT—David Seymour, 205 S. Robertson St., Beverly Hills, San Rafael Marina Housing Development (first unit 1,000 homes) 4,000 homes yacht basin and canal sys., shopping center and land fill. Total est. $150,000,000. August E. Waegemann, consult. engr., 251 Post St., San Francisco, will make overall plan. CD 9/25/46.

▲ Conn., Hartford—OFFICE—The Aetna Life Insurance Co., 151 Farmington Ave., plans by Ebbets, Frid & Prentice, 862 Asylum Ave., 6 story, 125x175 ft., 132,000 sq. ft. masonry HOME OFFICE addn. facing Sigourney St. and Farmington Ave. $3,500,000.

▲ Conn., New Haven—BUSINESS and INDUSTRIAL CENTER—Martin Olson, 2407 Whitney Ave., Hamden, 1 and 2 story, 480,000 sq. ft. business and industrial center, incl. stores, warehouses, industrial space. $5,000,000.

▲ D. C., Fort McNair—HOUSING—U. S. Eng., First and Douglas Sts. N.W., Wash. 25, D. C., plans by Milton J. Prassas, 5915 Massachusetts Ave. N.W., Wash., D. C. 46-family units of Capehart Housing. $1,000,000-$3,000,000.

▲ Md., Camp Detrick—HOUSING—U. S. Eng., First and Douglas Sts. N.W., Wash. 25, D. C., construct and finance 171 family housing units. (Capehart Housing). $1,000,000-$3,000,000. CD 8/15/51.

▲ Mo., Frontenac (St. Louis 24 P. O.)—HOSPITAL—Shriners Hospital for Crippled Children, 700 S. Kingshighway, St. Louis, Zone 10, brick, reinforced-conc., steel hospital on 10 acre tract on west side of Lindbergh Blvd., south of Clayton Rd. $2,000,000. CD 5/7/54, under Mo., St. Louis.

▲ N. J., Lakewood—HOSPITAL—Paul Kimball Hospital, River Ave., plans by Ferrenz & Taylor, 152 W. 42 St., New York, N. Y., Paul Kimball Hospital addn. $2,000,000. CD 9/30/46.

▲ N. J., Lawrence Twp.—OFFICE, etc.—Educational Testing Service, 20 Nassau St., Princeton, plans by Harrison & Abramovitz, 630 Fifth Ave., New York, N. Y., office and laboratories, 340-acre tract bounded by Carter, Rosedale and Province Line Roads and Stony Brook. $2,500,000.

▲ N. J., Livingston—HOSPITAL, etc.—St. Barnabas Hospital, 685 High St., Newark, plans by Ferrenz & Taylor, 152 W 42 St., New York 36, N. Y., 6 story hospital, medical center, Old Short Hills Rd. $10,000,000.

▲ N. J., Montclair—HOSPITAL—Mountainside Hospital, Bay and Highland Aves., plans by Voorhees, Walker, Smith & Smith, 101 Park Ave., New York 17, N. Y., hospital addn. $2,500,000.

▲ N. J., Mount Holly—HOSPITAL—Burlington County General Hospital, Mount Holly, plans by George Van Uffel, Jr., 30 Warwick Rd., Haddonfield, Burlington County General Hospital addn. $5,000,000.

▲ N. J., Newark—APARTMENT HOUSE—Arthur H. Padula, 81A Mt. Vernon Pl., plans by Romolo Botteili, Jr., 45 Branford Pl., 20 story air-conditioned apartment house, Elizabeth and Meeker Aves. $8,000,000.

▲ N. Y., Clay—HOUSES, etc.—Bayberry Communities, Inc., c/o Mayer & Whittlesey, archts., 51 Union Square, New York, Zone 3, 1,700 prefabricated houses; shopping center, office on 650 acre tract bounded by Wetzel Rd., Morgan Rd. and Rte. 57, near Syracuse. $43,000,000.

▲ N. Y., New York—HOMES—Bakery-Confectionary Workers International Union of America, 1860 Broadway, New York, Zone 23, Soundview Park Homes, twelve 13 story apartments on tract at Bruckner Blvd. and Bronx River Parkway. $27,500,000. To go ahead in 1957.

▲ N. Y., New York—SCHOOL, etc.—Columbia University, 116 St. and Broadway, plans by Harrison & Abramovitz, 630 Fifth Ave., Zone 20, 9 story law school and library; 9 story faculty office; 15 story graduate residence hall, 116 to 118 Sts., Morningside Dr. and Amsterdam Ave. $17,000,000. CD 10/5.

▲ Tex., Fort Worth—OFFICE—W. A. Moncrief, Jr., c/o W. T. Waggoner Bldg., 150,000-200,000 sq. ft. masonry office, 1,000-auto parking facilities, 9th St. between Main and Commerce Sts. $3,000,000.

▲ Tex., Richardson—SHOPPING CENTER—Northland Regional Shopping Center, c/o Dr. J. P. Addison & Assocs., 8400 Douglas St., Dallas, main shopping center, 100-acre site intersection Coit and Spring Valley Rds. $3,000,000.

▲ Va., Fort Belvoir—HOUSING—U. S. Eng., 1st and Douglas Sts. N.W., Wash., D. C., plans by E. Tucker Carlton, 206 E. Cary St., Richmond, construct and finance, 618-family units, Capehart Housing, 2nd unit. $5,000,000.

(Continued on page 100)

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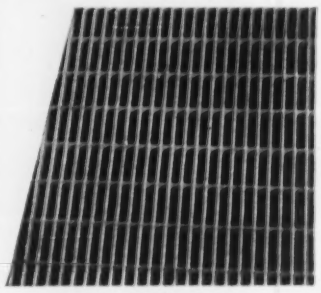

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(Continued from page 98)

▲ Wis., Milwaukee—SHOPPING CENTER—A. & J. Luber, 2510 N. Sherman Blvd., and C. Lubotsky, 2733 W. Wisconsin Ave., plans by Lefebvre, Wiggins & Assocs., 3882 N. Teutonia Ave., shopping center, $10,000,000. CD 12/1/53.

▲ Ont., Toronto—OFFICE, etc.—Canadawide Investments Ltd., 330 Bay St., plans by Peter Caspari, 102 Eglinton Ave. E., 9 story, bsmnt., 80x125 ft. office bldg. plus 5-deck parking garage. $2,500,000. Wallace, Carruthers & Assocs. Ltd., 92 Yorkville Ave., consult. engrs. Work in early 1957.

INDUSTRIAL BUILDINGS

▲ Calif., Antioch—PLANT—Crown-Zellerbach Corp., 343 Sansome St., San Francisco, Zone 19, corrugated plant. $2,500,000. Albert C. Martin & Assocs., 533 S. Beaudry Ave., Los Angeles, Calif. engrs. CD 2/23.

▲ Calif., Crockett—PLANT EXPANSION—California & Hawaiian Sugar Refining Corp., Ltd., 215 Market St., San Francisco, plant expansion, incl. steam plant. $6,000,000. Bechtel Corp., 612 S. Flowers St., Los Angeles, Zone 17, consult. engrs.

▲ La., Baton Rouge—REFINERY—Esso Standard Oil Co., (New Jersey), North Baton Rouge, refinery addns., to produce aviation gasoline, ethylene, and butadiene and basin gases. $40,000,000. Two year program. CD 10/9/52.

▲ Mich., Plymouth—PLANT—Burroughs Corp., 6071 Second St., Detroit, plans by Marr & Marr, 415 Brainerd St., Detroit, plant addn., $3,500,000. CD 3/20.

▲ Miss., Natchez—PLANT—Johns-Manville Corp., 22 E. 40 St., hardboard plant, 60 million sq. ft. annual capacity. $3,000,000. To be completed 1957.

▲ N. J., Bloomfield—PLANT—Schering Corp., 60 Orange St., Bloomfield, plant addns. $2,000,000.

▲ N. Y., Buffalo—SWITCHING STATION—Niagara Mohawk Power Co., 535 Washington St., expansion of facilities at Gardenville Switching Station, $2,000,000.

▲ N. Y., Tonawanda—PLANT, etc.—Dunlop Tire & Rubber Corp., River Rd., modernize golf ball plant; foam rubber plant, new 60-cycle electric power substation, equipment, $2,800,000.

▲ O., Columbus—FACTORY, etc.—H. S. Wollett, 3800 Olentangy River Rd., 4 story, 112,000 sq. ft. factory and office, at 3240 Olentangy River Rd. $2,000,000.

▲ O., Youngstown—PLANT—U. S. Steel Corp., 71 Broadway, New York, N. Y., iron ore sintering plant. $7,000,000-$8,000,000.

▲ Tex., Midland—PLANT—Cities Service Oil Co., Midland, natural gasoline plant, 50 million cu. ft. daily processing capacity; 250,000 gal. natural gas liquids daily. $3,750,000. CD 2/17/55.

▲ Wash., Spokane—PLANT—Inland Empire Pea Growers Assn., Oakesdale, pea processing plant with dry-pea splitting operation, feed mill, seed plant and elevator space. $1,000,000.

▲ Ont., Fort William—PLANT—Great Lakes Paper Co. Ltd., Fort William, plant expansion. $35,000,000. CD 1/11.

▲ Que., Thetford Mines—ASBESTOS MINE—National Gypsum Co., 325 Delaware Ave., Buffalo, N. Y., U.S.A., new asbestos mine in wilderness area, service bldg., roads 75 mi. S. W. of Quebec City, to be operated by Asbestos Mines Ltd. $5,000,000. To be started late in 1956 or early 1957. CD 10/25/51.

UNCLASSIFIED

▲ Ohio—TRANSMISSION LINES, etc.—Toledo Edison Co., Edison Bldg., addn. of 138,000 volt circuit on 57-mi. high-tension line from Lemoyne to Defiance with necessary sub-station facilities, $1,100,000; 138,000 volt line with sub-station facilities between Oak Harbor and Fremint, $1,000,000; 138,000 volt line from Jackman and Laskey Rds. to Centennial and Sylvania-Metamora Rds., $396,000; Ryan sub-station addns. in East Toledo, $225,000; Gould sub-station expansion, supplying Maumee area, $246,000. rewiring generators and retubing condensers at Acme sub-station, $500,000. line and transformer constr. to supply new customers and give addnl. capacity to growing industrial and commercial areas, $4,700,000 CD 6/20/50.

▲ Pennsylvania—TUNNEL—Pennsylvania Tunnel Comm., 610 Wood St., Pittsburgh, Zone 22, Fort Pitt Tunnel, $20,000,000-$25,000,000. Michael Baker Jr., Inc., Rochester, Pa., consult. engr. Ralph Smillie, 76 Ninth Ave., New York, N. Y., tunnel consultant. Wilbur Smith & Assoc., 265 Church St., New Haven, Conn., traffic consultant. Bids late Summer or early Fall. CD 3/5/56.

▲ Virginia—TUNNEL—Elizabeth River Tunnel Comm., Berkeley Plaza, Norfolk, 2nd tunnel from Norfolk to Portsmouth. $15,000,000-$20,000,000. Approved by Virginia General Assembly. Expect to get under way in 1956. Parsons, Brinckerhoff, Hall & Macdonald, 51 Broadway, New York 6, N. Y., J. E. Greiner & Co., 1106 N. Charles St., Baltimore, Md. and Singstad & Baillie, 24 State St., New York 4, N. Y., engineers have been invited to submit proposals. CD 3/20.

▲ Alberta—CRUDE OIL PIPE LINE—Cremona Pipeline Ltd., 3046 Ave. W., Calgary, 60 mi. crude oil pipe line connecting the Sundre Westward Ho, and Harmatten oil fields. $2,750,000.

▲ Saskatchewan—GAS PIPELINE—Saskatchewan Power Corp., 1739 Cornwall St., Regina, 12- or 16-in gas pipeline from natural gas field at Success to Moose Jaw, $6,000,000.

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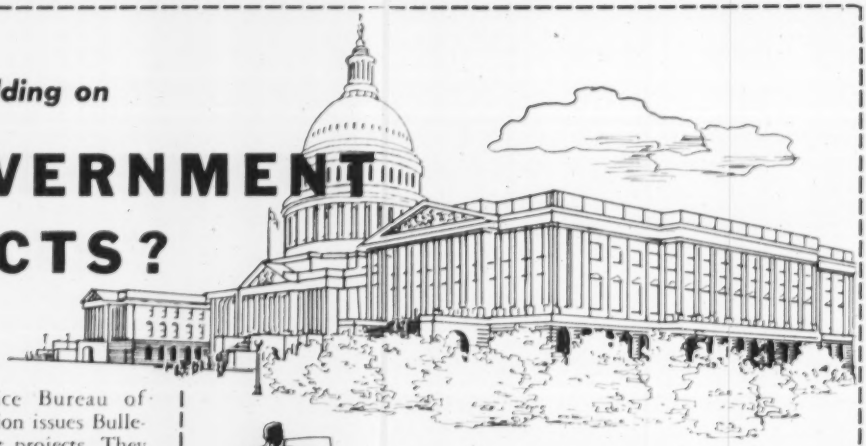

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NEW ENGLAND

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
April 26 Massachusetts
STREETS AND ROADS
April 17 Massachusetts

HEAVY CONSTRUCTION—LB & CA

▲ MASSACHUSETTS—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston.
Wes-Julian Constr. Co., 855 Providence Hy., Dedham, Mass. CA $4,111,998, est. $4,755,158. Constr. B, hy. and bridge constr. vicinity Columbia Rd. to Freeport St., Dorchester. CD 3/8, under LB.

▲† Merritt-Chapman & Scott Corp., 79 Milk St., Boston, Mass., CA $3,762,201, est. $4,000,000. marginal wharf, Naval Construction Battalion Center, NOY 89974, Spec. 47524, DAVISVILLE, R. I. First Naval Dist., 495 Summer St., Boston, Mass. Bids Mar. 22. CD 3/27, under LB.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
April 17 New Jersey April 20 Pennsylvania
May 10 New York
STREETS AND ROADS
April 17 New Jersey, Maryland April 20 Pennsylvania
May 10 New York

BUILDINGS—BA

▲ Pa., Conshohocken—MILL—BA 4/16—Alan Wood Steel Co., Conshohocken, cold strip mill addn. Total est. $14,000,000. CD 12/5.

▲ Pa., Ardmore—SCHOOL—BA 4/25—Lower Merion School Dist., Senior High School, Rosemont, $3,000,000, Vincent G. Kling, 917 Corinthian Ave., Phila., archt. CD 9/14.

HEAVY CONSTRUCTION—LB & CA

▲† Roscoe Constr. Co., 1107 19 St. N.W., Wash., D. C., LB $11,429,000. Power House, catapult and arresting gear development, paving facilities, Naval Air Station, NOy 91177, Spec. 49797, LAKEHURST, N. J. Dpt. Navy, Phila. Naval Base, Phila., Pa. Louis Berger & Assocs., 88 Main St., East Orange, N. J., archts.-engrs. CD 7/30/52.

BUILDINGS—LB & CA

▲ Shroder Co., Underhill Rd., Scarsdale, N. Y. Owner Builds. $8,000,000. 280 HOUSES on 333 acre tract on both sides of Old Farm Rd. from Bear Ridge to Bedford Rds., PLEASANTVILLE, N. Y. Roy S. Johnson, 48 Quarropas St., White Plains, N. Y., and Oscar A. Bugdan, Harwood Bldg., Scarsdale, N. Y., archts.

SOUTH

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
April 17 South Carolina April 18 Louisiana
May 3 Florida
STREETS AND ROADS
April 17 South Carolina April 18 Louisiana
April 20 Kentucky

HEAVY CONSTRUCTION—LB & CA

▲ † McDonough Constr. Co. of Georgia, 7 Baltimore Pl. N.W., Atlanta, Ga., CA $3,315,143. 280-unit family HOUSING (Eglin Auxiliary No. 9) ENG-01-076-56-35, HURLBURT AIR FORCE BASE, FLA. U. S. Eng., 2301 Grant St., Mobile 7, Ala. Bids Feb. 28, awarded Mar. 30. CD 3/8, under LB.

▲† General Dynamics Corp., Eastern Point Rd., Groton, Conn., LB $2,635,134, est. $4,000,000-$6,000,000. furnishing actuators and for design, fabrication and installation of control sys. for the nozzle of supersonic circuit of propulsion wind tunnel, Arnold Engineering Development Center, TULLAHOMA, TENN. U. S. Eng., Tullahoma, Tenn. CD 11/16/54.

BUILDINGS—LB & CA

▲ Arlington Realty Co., 2212 Wilson Blvd., Arlington, Va. Owner Builds. $6,000,000. 800 HOMES, 200 acres land, Manassas Park, MANASSAS, VA.

▲ Lummus Co., 385 Madison Ave., New York, N. Y., and Triangle Constr. Co., Washington Square Bldg., Tallahassee, Fla., CA, $20,000,000, cellulose pulp MILL addn., FOLEY, FLA. Buckeye Cellulose Corp. sub. Procter & Gamble Co., Gwynne Bldg., Cincinnati, O.

▲ Chaves Constr. Co., 310 91 St., Surfside, Fla., CA, $4,500,000, MOTEL, Collins Ave. and 180 St., SURFSIDE, FLA. Balmorton Corp., 310 91 St., Surfside, Fla., McKay & Gibbs, 957 41 St., Miami Beach, Fla., archts.

▲ Allied Structural Steel Co., 20 N. Wacker Dr., Chicago, Ill., CA $4,024,950, steel constr., incl. 10,000 tons steel for Municipal POWER PLANT, MEMPHIS, TENN. Memphis Light, Gas & Water Comm., 2996 Hy. 61 S., Memphis, Tenn. Awarded Mar. 30. CD 3/7, under LB.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
April 17 Ohio April 24 Wisconsin
STREETS AND ROADS
April 17, May 1 Ohio April 24 Wisconsin

▲† Ohio—NIKE SITES—BA 4/24—U. S. Eng., New Post Office Bldg., Pittsburgh, Pa., four NIKE sites at Willowick, Bratenahl, Lake Front and Rocky River, Cuyahoga Co. $4,000,000-$5,000,000. Extended date. CD 3/8.

▲ O., Toledo—BA 5/1—City, H. G. Rebensal, comr. Purchases, Safety Bldg., Contr. A, sewage treatment plant," constr. aeration tanks, gallery, gallery bldgs., final settling tanks for complete secondary sewage treatment plant battery having nominal capacity of 75 m.g.d. $4,500,000. Plans deposit $50. Consoer, Townsend & Assoc., 260 E. Grand Ave., Chicago 11, Ill. engrs. CD 4/16/53.

BUILDINGS—BA

▲ Ind., Lafayette—HOUSING—BA 4/18—Bd. Trustees Purdue University, West Lafayette, (a) single student dormitory courts, (b) married students courts and (c) combination of both (a) and (b). $5,000,000. Extended date.

HEAVY CONSTRUCTION—LB & CA

▲ Glenn Cooper, 2801 W. 9 Ave., Gary, Ind. Own Forces. $4,000,000. 390 HOMES, GARY, IND.

▲ F & S Construction Co., Box 108A, Palatine, Ill., Own Forces. $29,000,000, 1,800 HOMES, storm and sanitary sewers, paving in Schaumburg Twp., near CHICAGO, ILL. E. L. Kahn, 63 W. Jackson Blvd., Chicago 4, Ill., archt. Evert F. Kincaid, 105 W. Madison St., Chicago, Ill., landscaping archt.

▲ Sherman Olson, Inc., 219 Kilpatrick St., Chicago, Ill., CA, $4,500,000. FACTORY, OFFICE, Howard St., near Lehigh, NILES, ILL. Imperial Brass Co., 1200 W. Harrison St., Chicago, Ill. Awarded Mar. 23. CD 9/27.

▲ Arthur G. McKee & Co., Brower Rd., Cleveland, O., CA, Est. $7,000,000. 7,500 b/d CATALYTIC REFORMER at refinery, cooling tower, storage tanks, SHOPS and OFFICE, WOOD RIVER, ILL. Sinclair-Refining Co., 600 Fifth Ave., New York, N. Y.

▲ American Community Builders, Inc., 15917 Seven Mile Rd., Detroit, Mich. Owner Builds. $3,700,000. 150 brick HOMES, Southfield Farms Development, 10 Mile Rd., SOUTHFIELD, MICH.

▲ Darin & Armstrong, Inc., 2041 Fenkell St., Detroit, Mich.—CA Est. $7,000,000. parts and equip. mfg. PLANT, Rawsonville, YPSILANTI, MICH. Ford Motor Co., J. A. MacAlarney, plant engr., 3000 Schaefer St., Dearborn, Mich. Giffels & Vallet, Inc., 1000 Marquette Bldg., Detroit, Mich., archt. CD 11/2.

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
April 19 Missouri
STREETS AND ROADS
April 17 Iowa April 19 Missouri, Nebraska
April 20 Colorado, North Dakota

HEAVY CONSTRUCTION—LB & CA

▲ TEXAS—Texas Turnpike Auth., 214 First Federal Savings Bldg., Austin, Zone 1,
T. L. James & Co., Inc., Ruston, La., and W. R. Aldrich & Co., Box 1751, Baton Rouge, La., CA $3,214,139, paving 10.221 mi. from approx. 0.5 mi. west of Baileyville Rd. to approx. 1.1 mi. east of Watson School Rd. Cont. D-F-W 47, Tarrant Co. Bids Mar. 20. CD 3/27, under LB.

▲ Permian Basin Pipe Line Co., 2223 Dodge St., Omaha, Neb. Owner Builds. $2,800,000, gas pipe line and 6,750 h.p. compressor station, Andrews Co., TEXAS. John Malloy, c/o owner, engr. CD 4/4.

▲ Morrison-Knudsen Co., Inc., 319 Broadway, Boise, Idaho. CA Est. $21,000,000. Noxon Rapids Dam and power house on Clark Fork River, 1,054 ft. long, 190 ft. high, rein.-con., earthfill, MONTANA. Washington Water Power Co., W825 Trent St., Spokane, Wash. Bids Mar. 28. CD 3/7.

BUILDINGS—LB & CA

▲ Williard, Inc., 2901 N. Broad St., Phila., Pa. CA general constr., pentaerythritol and formaldehyde PLANT, LOUISIANA, MO. Total Est. cost $6,000,000. Hercules Powder Co., Delaware Trust Bldg., Wilmington 99, Del. CD 7/11.

Mississippi Valley Structural Steel Co., 3117 Big Bend Rd., St. Louis 17, Mo. CA refabricated steel (Louisiana, Mo.);
Ben Hur Constr. Co., 5100 Farlin Ave., St. Louis 15, Mo. CA erection of refabricated steel (Louisiana, Mo.);
American Bridge Co., Suburban Station Bldg., 1617 Pennsylvania Blvd., Phila. 3, Pa. CA structural steel (Louisiana, Mo.).

▲ General Electric Co., 620 Electric Bldg., Omaha, Neb. CA $3,009,155, Third GENERATING UNIT for Unit 3 of North Omaha Power Station, OMAHA, NEB., Omaha Public Power Dist., 17 and Harney Sts., Omaha, Neb. Bids Mar. 30. CD 2/21.

▲ The Texas Co., Port Arthur, Tex. Owner Builds. $6,575,000. POWER GENERATING STATION, steam and electric generating capacity exten. 3,300,000 lb. per hr. steam generators and one 15,000 kw. electric generator incl. auxiliary installations, PORT ARTHUR, TEX. Jackson & Moreland, 600 Park Square Bldg., Boston, Mass., engrs. CD 5/18/54.

FAR WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
April 25 California
STREETS AND ROADS
April 25, 26 California

▲ Wash., Seattle—TEACHING HOSPITAL—BA 5/5—University of Washington, Bd. Regents, Seattle, Zone 5, 8 story, 350,000 sq. ft. steel teaching hospital addn. $3,000,000. Plans deposit $200. Naramore, Bain, Brady & Johanson, 904 7 Ave., archts. CD 12/10/54.

HEAVY CONSTRUCTION—LB & CA

▲ Engineering Constr. Co., 402 N. Cheyenne St., Tulsa, Okla., CA, $3,000,000. installing pipe for natural gas distr. sys., Granger and Tupperish, WASHINGTON-OREGON-IDAHO. Cascade Natural Gas Corp., Securities Bldg., Seattle 1, Wash. Bids About Dec. 1. CD 11/29.
Curtis Constr. Co., 501 S. Walcott St., Casper, Wyo., CA, $1,700,000. installing pipe for natural gas dist. sys. in Pasco and Kennewick, (Washington, Oregon, Idaho).

▲† Campbell Constr. & Equip. Co., 1150 Folsom St., San Francisco, Calif. CA, $3,648,362, 4 guided missile control and launching areas in vicinity of Fairchild Air Force Base, Inv. 56-134, SPOKANE, WASH. U. S. Eng., 4735 E. Marginal Way, Seattle 4, Wash. Bids Mar. 15. CD 3/26, under LB.

▲ Guy F. Atkinson Co., 10 W. Orange Ave., South San Francisco, Calif., CA $6,534,349, concrete arch dam, power house and spillway, reregulating dam, fish ladder, Pelton Dam Proj., Jefferson Co., OREGON. Portland General Electric Co., 610 S.W. Broadway, Portland, Ore. Bids Mar. 16. CD 3/22, under LB.

▲ CALIFORNIA—State Div. Hys., 1120 N St., Sacramento.
Calif.—Peter Kiewit Sons Co., 442 Post St., San Francisco, Calif., LB $2,711,100. (5 bidders) 3.5 mi. freeway, 2 bridges near San Rafael, Marin Co.;
Calif.—Natt McDougall Co., 824 Pittock Block, Portland, Ore., LB $552,110 (5 bidders) 4-lane paved roadway U.S. 101, rein.-con. girder bridge across Wilson Creek, Del Norte Co. Bids Apr. 4. CD 3/8.

BUILDINGS—LB & CA

▲ Oddstad Homes, 727 Shasta St., Redwood City, Calif., Owner Builds. $66,000,000, 3,300 HOMES, Crestmont Subdivision, OAKLAND, CALIF. CD 5/12/55, under CA.

▲ Oddstad Homes, 727 Shasta St., Redwood City, Calif., Owner Builds. $5,725,000, Unit No. 5, Rollingwood Subdivision of 450 HOMES, SAN BRUNO, CALIF.

▲ T. G. Stone, 113 Atherton Ave., Atherton, Calif., Owner Builds, $20,000,000. 800 HOME subdivision Heather Farm on Ygnacio Valley Rd., near WALNUT CREEK, CALIF.

CANADA

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS
April 18, 24 Saskatchewan April 19 British Columbia

HEAVY CONSTRUCTION—LB & CA

▲ Manoir Ltd., 736 Granville St. Vancouver, B. C., CA, $2,500,000. (4 bidders) powerhouse, two 1,700 ft. penstocks, switchyard, and concrete tunnel liner, Squamish River, Cheakamus Hydro-Electric Proj. BRITISH COLUMBIA. British Columbia Electric Co. Ltd. 425 Carrall St., Vancouver, B. C., awarded Mar. 27. CD 11/4/54.

AMERICANS ABROAD

HEAVY CONSTRUCTION—LB & CA

▲† Samford-Markowitz, Inc., 5600 N.E. 4th Ave., Miami, Fla., U. S. A., LB $7,551,641, POL pumping station, various locations (Spanish Air Base Programs), SPAIN. Bureau Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., U. S. A. Bids Mar. 28. CD 3/12.

(Proposal Advertisements see p. 120 to 122)

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Now you can get a reliable precision instrument which, actually automatically levels itself, quickly, simply, easily—no complicated time-wasting adjustments . . . at an astonishingly low price!

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41-14 24TH STREET, LONG ISLAND CITY 1, N. Y.

Standard Sq Ft Measure for Office Buildings

The American Standards Association has just published a standard method of determining floor space in office buildings. Designed primarily to define rentable area, the method first determines construction space, then prescribes two systems of deductions: 1) to set rentable space for a single tenant, and 2) to set rentable space for multiple tenancy. This measure, once determined, prevails for the life of the structure.

This is the first step taken by the ASA in the development of nationwide uniform methods of floor measurement for office, school, industrial and government buildings.

According to the new formula, the office area is based in all cases upon the typical floor plan and measures to the inside finish of the permanent building walls. The area includes columns and projections necessary to the building.

These are the deductions for rentable space:

• **Full floor rentable area**—On full floors for single tenancy deductions are made for stairs, elevator shafts, flues, stacks, pipe shafts and vertical ducts with their enclosing walls.

• **Net rentable area, sub-divided floors**—If a floor is occupied by more than one tenant, the following additional deductions are made: corridors, toilets, air conditioning rooms, fan rooms, janitors' closets and electrical closets available for use by all tenants.

The net rentable area extends to the inside finish of permanent outer building walls in both cases. For multiple tenancy it extends to the office-side of corridors, and or to other permanent partitions and to the center of the partitions separating the premises from adjoining rentable areas.

Henry Lee of the National Association of Building Owners and Managers is chairman of the committee set up by the American Standards Association to establish standard methods of floor space measurement.

It is hoped that universal use of this standard will settle and eliminate misunderstandings caused by present deviating systems.

New Type Surfacing to Eliminate Creeping

To prevent their new taxiway extension from creeping under heavy wheel loads, the Los Angeles Department of Airports will apply the asphaltic concrete pavement in one 3-in. course rather than in the customary 2½-in. "leveling" course and 1½-in. "surface" course.

Single-course paving has already given satisfactory results at Los Angeles, California, International Airport. Savings in repairs and traffic interruptions due to separation of two-course surfaces under heavy wheel pressure will outweigh any disadvantages and added cost of the one-course construction.

The taxiway, 50 ft wide and 4,774 ft long, is designed for a 100,000-lb wheel load. The base for the 3-in. asphaltic surface will be 12 in. of crushed rock with a 28-in. subbase of selected material.

The $204,082 contract went to Warren Southwest, Inc., Torrance, Calif., who bid 2% under the second low bidder and 16.5% under the engineers' estimate.

Pereira & Luckman, Welton Becket and Paul R. Williams of Los Angeles are consulting engineers for the Department.

Wage rates include $3.00 for equipment operators, $2.41 for skilled, $2.30 for semi-skilled, and $2.20 for common labor.

The bidders include:

1C	Warren Southwest, Torrance, Calif.	$204,082
2	Oswald Bros., Los Angeles, Calif.	208,208
5	R. R. Hensler, Sun Valley, Calif.	222,650
EE	Pereira & Luckman, Welton Becket, & Paul R. Williams	248,207

Bids: 1-24-56		Quan-	Unit Prices	
Items	Unit	tity	1C	2
Pave, bit, remov	sy	10,680	$0.226	$0.25
conc, remov	sy	1,540	0.92	0.80
FIDO lines, remov *	lf	4,000	2.26	2.25
Pull boxes, conc, remov	ea	4	45.00	35.00
Taxi lights etc, remov	ea	13	56.00	65.00
Removals, misc	ls	job	1,025.	1,000
Excavation	cy	30,200	0.615	0.68
Sub-base matl, select	cy	31,200	1.20	1.20
Crushed rock base	cy	11,240	6.11	6.43
Asph concrete	t	7,820	6.32	5.92
Soil sterilizer	sf	57,200	0.006	0.005
Prime coat	t	50	33.50	30.00
Conduit, galv, 2"	lf	3,650	1.63	1.80
CMP, 11x18"	lf	300	5.31	5.30
16x25"	lf	205	6.63	8.60
18x29"	lf	205	7.11	9.00
Inlet, single grating	ea	2	350.00	270.00
two grating	ea	1	425.00	600.00
Junction chamber	ea	1	255.00	300.00
Headwall (endwall)	ea	4	170.00	150.00
Striping	ls	job	350.00	350.00

*FIDO Fog, Intensifying, Dispersal Of
Work starts: 4-1-56 To be Completed: 7-14-56.
No liquidated damages

NOW

YOU CAN SEE

THE "COBRETTE"

it's on the job or on its way to projects near you

10 cu. yds. heaped
7.5 cu. yds. struck

Out of four years of engineering development and field testing comes this completely new all-purpose tool. New power train with smooth fluid coupling drive, new hydraulic rotary cylinder powered "Gear Steer," plus other exclusive features set new standards in maneuverability, high production and service simplicity.

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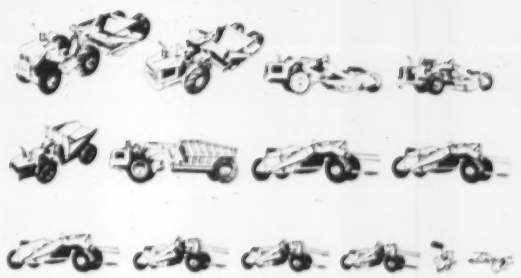
CONTINENTAL COPPER & STEEL INDUSTRIES, INC.
Sunnyvale, California, U. S. A.



Materials and Labor Prices

Monthly Market Quotations by ENR Field Reporters

See following ENR issues for OTHER PRICES:

- Apr 19 — Wood Products, Glass, Explosives, Chemicals
- Apr 26 — Clay Products, Lime, Plaster, Paint, Roofing
- May 3 — Wage Rates, Building Board, Lath, Insulation

IRON AND STEEL PRODUCTS — PER 100 LBS. BASE MILL PRICES

	STRUCT SHAPES	PLATE CARBON STEEL	REINF BARS billet	RIVETS ½-in. structural	SHEET PILING Base	STEEL RAILS Per Net Ton Standard	STEEL RAILS Per Net Ton Light	TRACK SUPPLIES Angle Bars	TRACK SUPPLIES Std Spikes	TRACK SUPPLIES Tie Plates	TRACK SUPPLIES Track Bolts
Birmingham Area	$4.60	$4.50	$4.65	$9.25		$94.50	$113.00	$5.825	$7.90	$5.625	.....
Chicago Area	4.60	4.50	4.65	9.25	$5.45	94.50	113.00	5.825	7.90	5.625	.....
Pittsburgh Area	4.60	4.50	4.65	9.25	5.45	94.50	113.00	5.825	7.90	5.625	$11.50
Buffalo Area	4.60	4.50	4.65	9.25	5.45	94.50	113.00	5.825	7.90	5.625	11.50
Cleveland	.....	.....	4.65	9.25	5.45	.....	.....	.....	.....	.....	11.50
Youngstown Area	.....	.....	4.65	.....	.....	.....	.....	.....	7.90	.....	.....
Geneva	4.60	4.50	.....	.....	.....	.....	.....	.....	.....	.....	.....
Los Angeles	.....	.....	.....	.....	5.45	.....	.....	.....	7.90	.....	.....
Pueblo	4.90	5.35	5.10	.....	.....	.....	95.00	5.825	7.90	5.625	12.40

IRON AND STEEL PRODUCTS — F.O.B. WAREHOUSE, PER 100 LBS., BASE PRICE

	STRUCTURAL SHAPES Per 100 lb. base price	REINFORCING BARS Per 100 lb., base price 5 tons to carload lot New billet	REINFORCING BARS Per 100 lb., base price 5 tons to carload lot Rail steel	EXPANDED METAL LATH Per 100 sq. yd., carload lots Std. diamond mesh, 3.4 lb.	EXPANDED METAL LATH Per 100 sq. yd., carload lots Std. ribbed 3.4 lb.	WELDED FABRIC REINFORCING Per 100 sq ft., carload lots fob mill
Atlanta	$7.78		$8.25[f]	$50.00	$55.00	
Baltimore	8.03	7.52[j]		39.00	43.50	
Birmingham	7.28[t]	7.08[t]	7.08[t]	61.00[p]	67.00[p]	
Boston	8.13[a]	7.82	7.82	44.00	48.50	4 × 16 in., No. 5 & 10 wires— Joliet, Ill., Donora, Pa., Monessen, Pa. $3.40
Chicago	7.43	6.23[gu]	6.23[gu]	49.00‡	60.00‡	
Cincinnati	7.90[uk]	7.56[rs]		41.00[ma]	45.50[ma]	4 × 12 in., No. 8 & 12 wires— Joliet, Ill., Donora, Pa., Monessen, Pa. $2.22
Cleveland	7.76	6.41[c]		41.00‡	45.50‡	
Dallas	9.05	7.40	7.40	49.00	52.00	
Denver	8.95	8.00[c]	.....	54.00[n]	60.00[n]	6 × 6 in., No. 6 & 6 wires— Joliet, Ill., Donora, Pa., Monessen, Pa. $3.87
Detroit	7.90	7.38	.....	56.00	63.00	
Kansas City	7.95[a]	7.75	.....	49.00	60.00	
Los Angeles	8.15[d]	7.60	.....	54.50	60.50	
Minneapolis	7.83[d]	8.14[b]	8.14[b]	42.50	47.00	
Montreal	7.70-8.15[c]/7.75-8.15[A]	7.50/8.65[s]	7.50/8.65	65.00[A]	70.00[A]	
New Orleans		7.05[uks]		48.50	49.50	
New York	8.19	7.35[y]**	7.35[y]**	44.50[no]	51.00[no]	
Philadelphia	8.04	7.14	.....	42.50‡	47.00‡	
Pittsburgh	7.43	6.57**	.....	42.50	47.00	
St. Louis	7.83[s]	6.75[c]	6.75[c]	57.00[t]	59.00[t]	
San Francisco	8.55	7.55[j]	.....	47.50	53.00	
Seattle	8.35[c]	7.00[vj]	.....	55.00[nr]	61.00[nr]	
Toronto	8.40*	7.25	7.25	53.50[nq]	67.50[nr]	

Quantity extras, per cwt: under 100, + $6; 100-399, + $3; 400-999, + $1.25; 1000-1999, + $1c; 2000-4999, base price; 5000-9999, — 10c; 10,000-19,999, — 20c; 20,000-29,999, — 30c; 30,000 and up, — 50c.

EXTRAS, per cwt: Quantity: less than 700, + 50c; 700-1499, + 25c; 1500-2999, + $1.10; #4 + 90c; #5 + 62.5c; #6, #7 + + 45c; #8, #9, #10, #11 + 35c. Bending: heavy, + 80c; light, + $2 (except in New York City and surrounding metropolitan area where bending must be done on the job). Engineering (details and placing from designs by others): over 500 tons, + 45c; 200-500 tons, + 5/c but not over $2000; 5-20 tons, + 70c but not over $70. Design only: + 60c.

*‡ Delivered *a 2000-9999# *b 10,000-15,999#, fob city *c 20 tons or over *d 10,000-19,999# *e fob plant *f Incl. delivering in free zone *g CL *h list price; dominion tax exempt; add provincial and municipal taxes *i add dominion, provincial and municipal sales taxes *j intermediate and hard grade *k fob city *l delivered; contractor to do unloading *m copper alloy *n LCL *o asphalt coated *p del. of 500 sq. yd. or more. *q 3# *r 2% off for cash *s 2,000-4,999# *t add 15¢ del. *u add 6.25¢ switch *v incl 15¢ del. *w 3.5¢ *x add 5¢ switch *y add 30¢ del. *z add 10¢ del. *A American made. *C Canadian made. † Number system replaces inch system of classifying bar sizes. New system is based on number of eighth inches in diameter of bar. ** Aver. of Canadian & American. *** 4 tons

PLUMBING, HEATING, WATER, SEWER AND DRAIN PIPE

	C. I. PIPE PRICE INDEX[a]	ASBESTOS CEMENT PIPE per lin. ft. f.o.b. city 6' Pr Cl. 150	ASBESTOS CEMENT PIPE per lin. ft. f.o.b. city 12' Sew Cl. I	VITRIFIED SEWER PIPE Per foot, Delivered ASTM C13-44T std. 8 in. s.s.	VITRIFIED SEWER PIPE Per foot, Delivered ASTM C13-44T std. 12 in. s.s.	VITRIFIED SEWER PIPE Per foot, Delivered ASTM C13-44T 24 in. ds.	VITRIFIED SEWER PIPE Per foot, Delivered ASTM C13-44T 36 in. ds.	CLAY DRAIN TILE ASTM C4-24 PER 1,000 ft., carload lots, f.o.b. 6 in.	CLAY DRAIN TILE ASTM C4-24 PER 1,000 ft., carload lots, f.o.b. 8 in.	CONCRETE SEWER PIPE Per ft., delivered: ASTMC 14-41 12 in.	CONCRETE SEWER PIPE Per ft., delivered: ASTMC 14-41 24 in.
Atlanta	115.6	$1.56	$2.60	$.55	$1.30	$4.95	$13.25	$225.00		$0.88[m]	$3.25[m]
Baltimore	124.9	1.56	2.60	.595	1.1475	4.50[v]	12.095	178.20	$274.80	1.01	2.75[m]
Birmingham	111.3	1.56	2.60	.44	.81	3.55[w]	10.37[w]	260.00‡	440.00‡	1.90[m]	4.00
Boston	127.5	1.58	2.39	.672[qrt]	1.296[qrt]	5.31[qrt]		197.40[r]	303.60[r]	1.54[mg]	3.65[mg]
Chicago	124.9	1.56	2.39	.90[m]	1.74[m]	6.25[m]	19.00[m]	150.00‡	270.00‡	1.00	3.65
Cincinnati	120.0	1.58	2.47	.665[t]	1.2825[t]	4.905[t]	12.505	240.00	370.00	.80[m]	2.95[m]
Cleveland	125.6	1.58	2.47	.567[s]	1.1475[s]	4.545[t]	11.787[t]	149.40[m]	231.60[m]	.85[m]	3.25[m]
Dallas	122.1	1.58	2.73	.439	.799	4.00[b]	9.17[b]	.....	.....	.49	1.60
Denver	131.0	1.66	2.73	.45[n]	.78[n]	3.48[n]	.....	.....	.....	.74[m]	2.50[m]
Detroit	125.9	1.58	2.47	.85	1.65	6.45	17.50	240.00[m]	370.00[m]	.95	3.82
Kansas City	122.7	1.58	2.47	.61	1.105	4.54	12.75	250.00	480.00	.90	2.90
Los Angeles	133.1	1.66	2.39	.67[l]	1.46[l]	5.97[l]	14.89[l]	228.20[l]	348.90[l]	.95	2.75[l]
Minneapolis	133.0	1.61	2.60	.78[mo]	1.42[mo]	6.25[mo]		.....	.....	1.66[A]	4.47[A]
Montreal				1.02[u]	1.80[u]	6.30[u]	12.00[u]	.....	.....	1.17[A]	3.11[f]
New Orleans	118.0	1.56	2.60	.51	.925	5.18		350.00[p]	550.00[p]	.75	2.50
New York	123.8	1.58	2.39	.94	1.78	6.96	18.14			1.15	3.00
Philadelphia	122.9	1.56	2.39	.65	1.25	4.95[e]	12.65[e]	300.00‡	350.00‡	1.60[A]	3.95[A]
Pittsburgh	126.7	1.58	2.39	.468[m]	.864[m]	3.86[m]	9.78[m]	152.00	244.00	1.05[A]	2.50[A]
St. Louis	121.3	1.56	2.47	.56	1.03	4.22	9.80	180.00[t]	280.00[t]	1.30[t]	2.80[t]
San Francisco	133.1	1.66	2.39	.74[d]	1.62[d]	6.59[d]	16.47[d]	235.00[t]	392.00[t]	1.95[m]	3.30[m]
Seattle	133.1	1.66	2.39	.666	1.265	6.34	17.90	205.00[c]		1.00[k]	3.10[k]
Toronto				.76	1.425	5.70		157.00	280.00	.87	3.05

*‡ Delivered. *a PRICE INDEXES for CENTRIFUGAL CAST IRON PIPE (Include carload freight allowed to city). These also serve as the HISTORICAL RECORD of THE $ PER NET TON PRICE of CLASS B, B&S, PIT CAST IRON PIPE. F.O.B. Foundry Price Indexes Birmingham, Ala., 111.3; Burlington, N. J., 120.1. *b Extra strength ASTM C 200-44T *c 4-in., $113 *d SS361-A *e 30-in. *f 21 in. *g culvert pipe; reinforced, ASTM C 76-41 *h reinforced, ASTM C 75-41 *i reinforced, ASTM C 76-37 *j centrispun; no standard specs. in Canada *k 2% off for cash *l fob plant *m truck delivery *n LCL delivered, fob truck *o listed price based on LCL (no min.) *p freight allowed to destination in city *q ASTM C 13-40 *r CL fob origin, freight allowed *s 2 ft lengths *t 3 ft lengths *u CESA A 60-1941 specs. used *v standard strength *w ss; add 20% for d.s.

***WROUGHT STEEL PIPE**

(Full standard weight)

Discount from list; see footnote

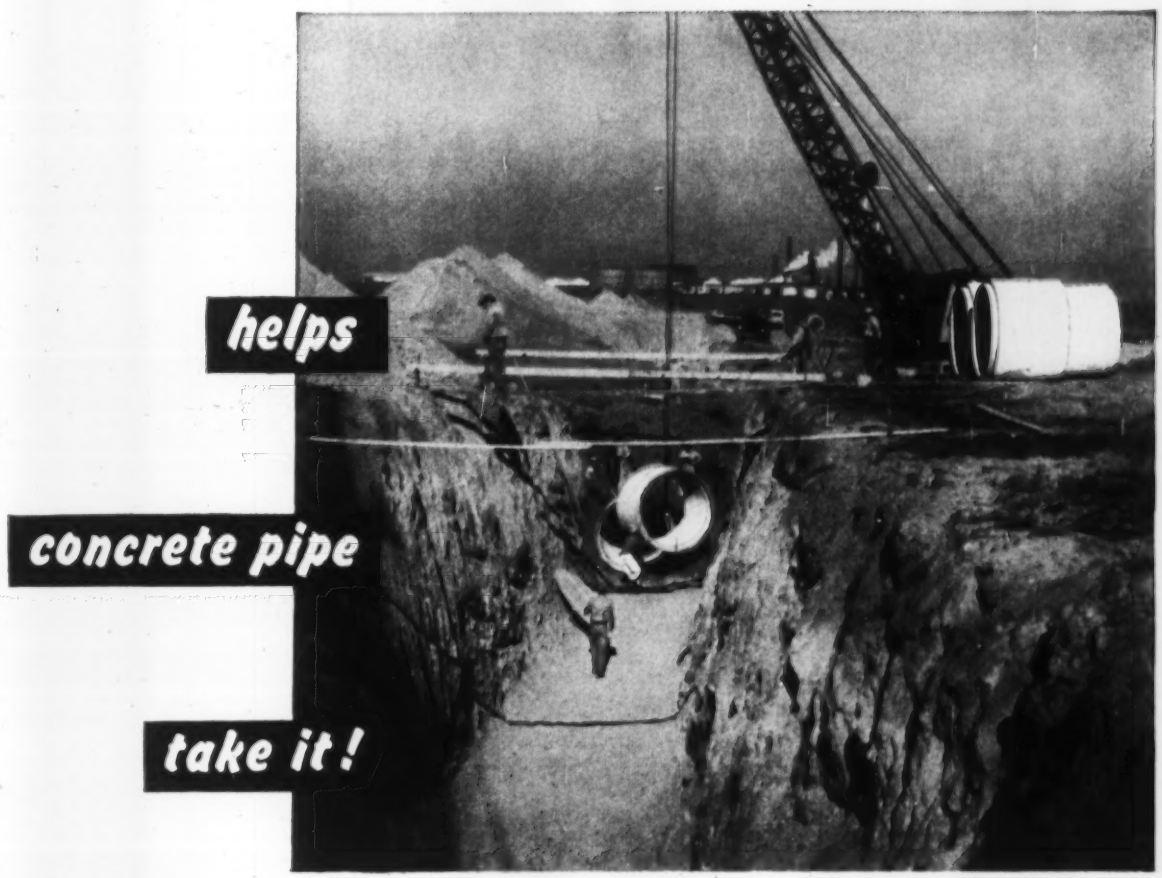
	Mill	Black %	Galv. %	Black %	Galv. %	Black %	Galv. %
		1¼ to 6 in.; Lap Weld		2½ & 3 in.; Butt Weld		Lap Weld 3½ in.	
Lorain, Ohio		+5.25	+0.75[d]	29.00	11.75	29.00	10.75
Aliquippa, Pa		+5.25	+0.25	29.00	15.25	29.00	10.75
Sparrows Pt., Md.			+0.25	27.00	8.75	24.00	9.75
Benwood, W. Va		19.50[a]	19.50[d]	29.00	10.75	29.00	10.75
Youngstown, O		13.50[a]	17.50[d]	29.00	10.75	29.00	11.75
Indiana Harbor, Ind		19.50[d]	18.50[d]	24.00	9.75	24.00	2.75[b]
Sharon, Pa		19.50[a]	19.50[d]	29.00	10.75	29.00	10.75
Wheatland, Pa		17.50[d]	17.50[d]	29.00	11.75	29.00	11.75
Etna, Pa		15.50[d]	15.25[d]	29.00	15.25	29.00	15.25
Fontana, Calif		7.00[ab]	7.00[ab]	16.50[b]	2.75[b]	16.50[b]	2.75[b]

† Threaded and coupled. a 3½ to 4 in. b Continuous weld. c 5 and 6 in. d 6 in.

*** WROUGHT STEEL PIPE:** Deduct discounts shown above from the following standard list consumers carload prices to get mill price. List prices per ft. (based on approx. $200 per net ton): Butt Weld ¼ in., 8½¢; ⅜ in., 6¢; ½ in., 8½¢; ¾ in., 11½¢; 1 in., 17¢; 1¼ in., 23¢; 1½ in., 27½¢; 2 in., 37¢; 2½ in., 58½¢; 3 in., 78½¢. Lap Weld 3½ in., 92¢; 4 in., $1.09; 5 in., $1.48; 6 in., $1.92. Add freight rates plus 3%, transportation tax to get destination price.

WROUGHT IRON PIPE: List prices per ft. same as for wrought steelpipe, but 4d following "discounts" to get Pittsburgh mill price: Butt Weld — 1 in. black, + 50.25, galv., + 78.50; 1¼ in. black, + 50.25, galv. + 78.0, 1½ in. black, + 46.75 galv. + 74.25; Lap Weld — 2½ in. to 3 in. black + 52.50 galv. + 78.50; 4½ in. to 6 in. black + 49.50 galv. + 73.75 Add freight rates plus 3%, transportation tax to get destination price.

CLINTON WELDED WIRE FABRIC



For a maintenance-free pipe system that's strong enough to withstand heavy loads, one that will minimize corrosion, use concrete pipe reinforced with Clinton Welded Wire Fabric.

This fabric imparts highly desirable strength to concrete pipe because every joint of the fabric is securely welded to form a firm anchorage for the concrete. This, in turn, gives better load distribution and controls cracking.

Clinton Welded Wire Fabric meets all A.S.T.M. specifications and is available in a complete range of gauges and mesh sizes. So, next time you need pipe—it'll pay you to specify concrete pipe reinforced with Clinton Welded Wire Fabric.

WHEN THEY ASK...

"is it Reinforced"

SAY YES... WITH

CLINTON CF&I

WELDED WIRE FABRIC

THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION Albuquerque • Amarillo • Billings • Boise • Butte • Casper • Denver • El Paso • Ft. Worth • Houston • Lincoln (Neb.) Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • Seattle • Spokane • Wichita • WICKWIRE SPENCER STEEL DIVISION— Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia • CANADIAN REPRESENTATIVES AT: Calgary • Edmonton • Toronto • Vancouver • Winnipeg

3553

MUELLER®

meet you in St. Louis*

*AWWA CONVENTION

May 6-11, 1956

Drop by booths 110, 111 and 112 at Kiel Auditorium to see our *all new* waterworks equipment display.

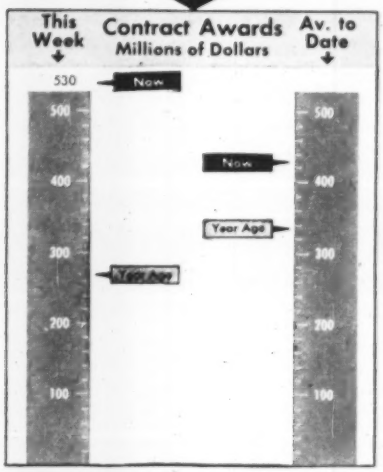
Our congratulations to the American Water Works Association on their Diamond Anniversary. Its accomplishments and progress in promoting better knowledge of water purification and distribution services has contributed greatly to the growth of the industry.

75 YEARS OF PROGRESS
1881 1956

MUELLER CO.
Dependable Since 1857
MAIN OFFICE & FACTORY DECATUR, ILLINOIS

Construction Scoreboard

Activity this Week



AMOUNT OF CONTRACTS LET

By Ownership	This Week	Cum. 15 wks 1956	Chge %
	$ millions		
Federal	$44.0	$534.1	+8
State and Municipal	109.7	1,749.4	+27
Total Public	153.7	2,283.5	+22
Total Private	376.1	4,276.1	+37
U. S. Total	$529.8	$6,559.6	+32
By Type of Work			
Waterworks	$4.5	$81.2	+10
Sewerage	5.6	187.4	+67
Bridges	13.2	168.7	+25
Highways	53.1	651.4	+25
Earthwork, Waterways	5.1	191.4	+51
Buildings:			
Public, Excl. Hsg.	33.5	551.8	+15
Public Housing	0.6	104.7	+98
Private Housing	211.1	1,905.9	+0.3
Commercial	18.0	590.9	+31
Industrial	103.0	1,546.0	+163
Unclassified	82.1	577.2	+8
U. S. Total	$529.8	$6,559.6	+32

NOTE: Minimum size projects included are: Waterworks and waterways, $44,000; other public works, $73,000; industrial buildings, $93,000; other buildings, $344,000.

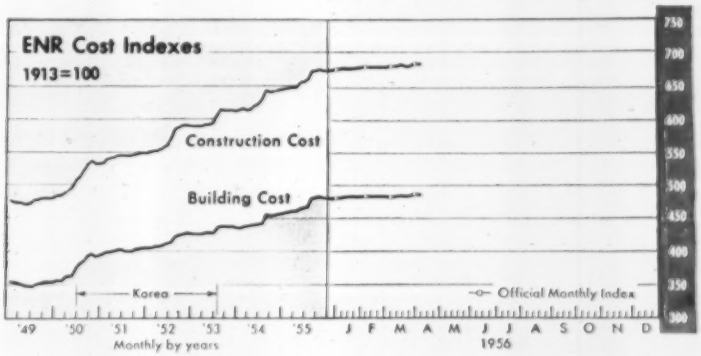
NEW CAPITAL FOR CONSTRUCTION

	Week of Apr. 5	Cum. 14 wks 1956	Chge '55-'56 %
	$ millions		
Corporate Securities	$68.5	$780.6	−3
State and Municipal:			
All Except Housing	80.0	1,277.5	+15
Housing	...	20.3	−52
Federal Loans	4.6	29.5	+27
Federal Aid	...	...	...
Total Nonfederal	$153.1	$2,107.9	+6
Federal Appropriations:			
In U. S.	$...	$34.4	...
Outside U. S.	...	...	...
Total New Capital	$153.1	$2,142.3	+8

Cost Indexes as of Now

ENR INDEXES (1913 = 100), 20-cities' average	1956 April 5	Percent Change from last Month	Year
Construction Cost	683.22	+0.3	+5.4
Building Cost	485.78	+0.5	+5.4

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.088; Building Cost by 1.845.
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518.



CONTRACTS AWARDED	1956 Mar.	3-Mos.	Percent Change from 1955 Mar.	3-Mos.
Millions of dollars				
Total U. S., ENR reported	$2,379.2	$5,753.3	+20	+32
Private	1,633.3	3,743.9	+22	+33
Public	745.9	2,009.4	+15	+30
State and Municipal	581.9	1,531.0	+19	+36
Federal	161.0	478.4	+3	+13
ENR Volume Index, 1913 = 100	786	722	+13	+27

NEW CAPITAL FOR CONSTRUCTION				
Millions of dollars				
Total U. S.	$996.1	$1,939.2	+27	+9
State and Municipal Bond Sales	573.4	1,217.7	+29	+17
Corporate Security Sales	378.4	712.2	+13	−7
Federal Loans, Aid (nonfederal work)	9.9	24.9	+90	+13
Federal Appropriations (federal work)	34.4	34.4	*	*

*No appropriations in 1955 period.

MATERIALS SHIPMENTS Unit	1956 or 1955 Dec.(D) Jan.(J) Feb.(F)	Mos.(12) Mos.(1) Mos.(2)	% chg from '54 or '55 Mo.	Year Cum.
Portland Cement, Bur Mines thous bbls	16,979(D)	292,698(12)	+ 4	+ 7
Concrete Paving Awards, PCA thous sq yd	8,259(F)	15,479(2)	+13	+ 5
Fabricated Structural Steel thous tons	283(F)	535(2)	+33	+22
Bookings, AISC thous tons	329(F)	734(2)	+40	+54
Reinforcing Bars, Net, AISI thous tons	185(J)	185(1)	+60	+60
Lumber, NLMA mil fbm	2,904(J)	2,904(J)	+ 3	+ 3
Orders mil fbm	3,133(J)	3,133(1)	+ 3	+ 3
Douglas Fir Plywood, DFPA, 3/8" basis Production (aver. per week) mil sq ft	105.4(F)	103.6(2)	+ 8	+ 8
Orders (average per week) mil sq ft	101.0(F)	98.3(2)	− 4	− 4
Clay Products, Bur Census Brick, Ungl. Common, Face mil bri	480.4(D)	7,012.3(12)	+ 4	+15
Vitrified Clay Sewer Pipe thous tons	117.9(D)	1,874.4(12)	− 3	+15
Structural Tile, Unglazed thous tons	59.6(D)	834.5(12)	− 7	− 7
Aluminum, Wrought, Net, Bur Census Plate, Sheet, and Strip mil lb	138.6(D)	1,542.6(12)	+28	+32
Roll Structural Shapes, Rod, Bar, Wire mil lb	31.8(D)	368.4(12)	+11	+ 2
Extruded Shapes, Tube Blooms, Tubing mil lb	64.2(D)	786.5(12)	+20	+53

EMPLOYMENT AND FAILURES				
Contract Const Employ, BLS thous	2,217(F)	2,238(2)**	+ 2	+ 2
Contractor Failures, Number†	141(F)	267(2)	+25	+34
Contractor Failures, Liabilities† thous	$9,981(F)	$16,044(2)	+30	− 4

** Average per month. † Dun & Bradstreet

CORRECTIONS TO ENR INDEX REVIEWS (April 5 and earlier 1956 Scoreboards): Building Cost Index Oct. '55 should be 479.99 instead of 477.99 (1913 = 100). Construction Cost Index Feb. '56 should be 680.01 not 680.00.

5 "Euc" REAR-DUMPS

10-Ton

The Model UD has a 6½ cu. yd. body and rated payload of 20,000 lbs.—a quarry body with flared sides is available for rock work. Designed for smaller mine, quarry and construction work, this Rear-Dump has a 128 h.p. engine and 10-speed transmission providing a top speed of 36 m.p.h. Drive axle is spring mounted—tires are 11.00 x 24 front with 12.00 x 24 rear duals.

15-Ton

There are two models of this capacity "Euc". One has a 10 cu. yd. body, 165 h.p. engine, semi-rigid drive axle and manual steering—the other has a 218 h.p. engine, 10½ yd. body, spring mounted drive axle and hydraulic steering. The latter model can be equipped with larger tires to increase the rated payload to 18 tons. Both have 5 speed transmissions and 14.00 x 24 tires standard—a quarry body for either model is available.

22-Ton

Practically a "standard" on larger quarry, mine and heavy construction projects, the Model TD "Euc" has a 300 h.p. engine, spring mounted drive axle, and 15 yd. body. Tires are 14.00 x 24 front with 18.00 x 25 duals rear. Hydraulic steering is standard, and a quarry body is available. This "Euc" can be equipped with a 10-speed transmission or Torqmatic Drive—it's a top performer on the toughest jobs.

EUCLID DIVISION, GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

10 to 50 TONS—128 h.p. to 600 h.p.

A Complete Line of Off-highway Haulers

34-Ton

This Twin-Power tandem axle "Euc" has two engines providing a total of 400 or 436 h.p.—each engine drives an axle through a separate Torqmatic Drive. The exhaust heated body has a capacity of 24 yds. Tires are 16.00 x 25 front, with 16.00 x 25 rear duals in tandem. For jobs where large loading equipment is used and big loads must be hauled, the Model FFD has no equal for low cost production and performance.

for

CONSTRUCTION, MINE, QUARRY and INDUSTRIAL WORK

Rear-Dump "Eucs" are the outstanding choice for moving heavy excavation on the toughest jobs because they are built exclusively for off-the-highway service. They have the capacity, power and speed to haul big loads faster and at lower cost per ton or yard moved.

The simple, rugged construction of Euclid Rear-Dumps pays off in long life and low maintenance cost. There's less down time for repairs . . . more work-ability. These "Eucs" have engines of 128 to 600 total h.p. . . . single and tandem drive axles . . . standard or quarry type bodies . . . gear transmissions and Torqmatic Drive . . . spring mounted and semi-rigid drive axles . . . top speeds, with full payload, up to 36 m.p.h.

Wherever you see Rear-Dumps in off-highway work, it's almost a sure thing they are "Eucs" because Euclid has been the leader in this field for over 20 years. There are more Rear-Dump "Eucs" in service than all other makes of off-highway haulers combined. Have your Euclid dealer supply helpful data on this complete line of Rear-Dumps and other Euclid earth moving equipment . . . you may find, as hundreds of owners already have found, that ***Euclids are your best investment.***

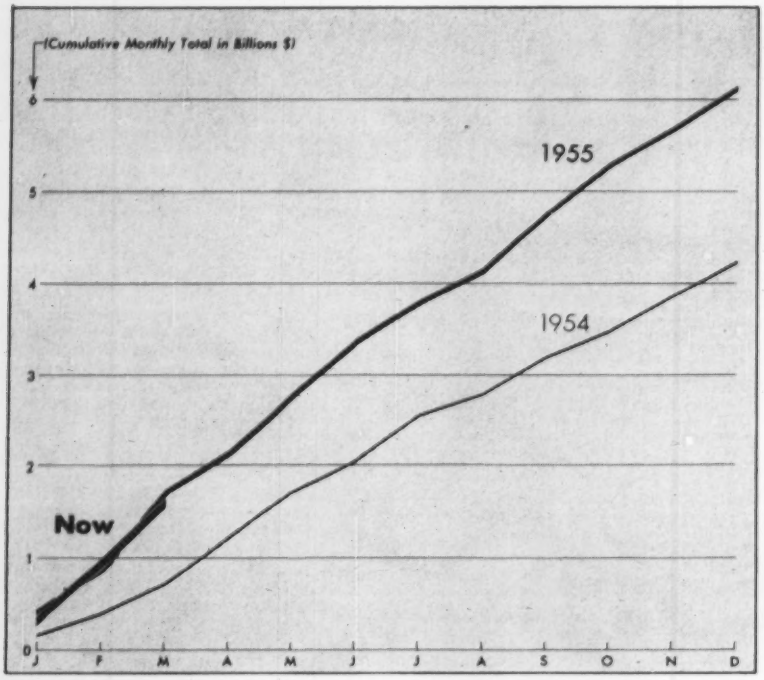
50-Ton

Largest Rear-Dump hauler in standard production, the Model LLD Euclid is designed for the biggest, toughest jobs. It has two engines, providing a total of 600 h.p.—each of the spring mounted drive axles is driven through separate Torqmatic Drives. The exhaust heated body has a 32 yd. capacity. All tires are 18.00 x 33. Twin Euclid hoists have ample power to raise the fully loaded body fast for quick, clean dumping.

Rear-Dump "Eucs" are your best bet

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE



How Private Mass Housing Is Shaping Up . . .

←The total today vs. 1954 and 1955

By regions the first quarter looks like this →

Housing Awards Hover Near 1955

The much-publicized "slump" in homebuilding isn't a slump at all. Residential construction contracts in the first quarter of 1956 came close to last year's record level, according to ENR reports.

Private mass housing contracts, which have been winding above and below last year's high volume from January to March, ended the first quarter of '56 only 6% short of the first three months of 1955. And, if public housing is added, the first quarter's mass housing awards come within 3% of the same period in 1955. In dollar volume, the first three months of this year were the second best on record.

Comparison with last year suffers from the fact that in 1955 every region except New England reached its peak month of the year during the first quarter. In 1954, the peak month for private housing contracts appeared in the second quarter for four of the six regions. This year's pattern could follow 1954.

• **Some regions up, some down**—Regionally, private housing activity varied widely in the first quarter from a gain of 61% for the state West of the Mississippi to a log of 78% in the South (see charts and table).

The West-of-the-Mississippi region got a big boost from a single, super-size ($200-million) housing project in Colorado.

In the Far West, rains and floods retarded all construction activity in the late winter months. But by March, private housing contracts soared to a new high of $130 million—nine times greater than either January or February.

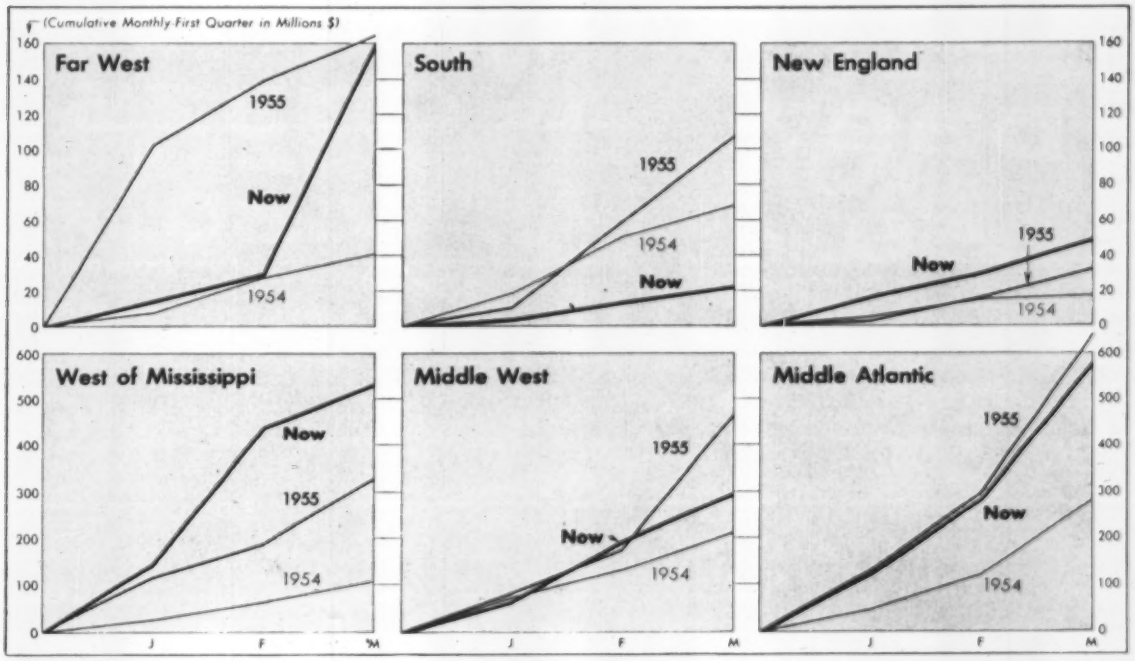
Layoffs in the automotive industry may be reflected in the lagging housing contracts for the Middle West states. Michigan, for example, cut its mass housing awards in half compared with last year's $78 million vs $155 million).

But in Pennsylvania, the prolonged Westinghouse strike had little, if any, effect on the housing boom in the Keystone State. First quarter mass housing contracts there totaled $182 million against $131 million last year —a gain of 39%.

• **Where do we go from here?**—But what's the outlook for the balance of the year? There are at least eight reasons to believe that 1956 will be as good or better than record-shattering '55.

• The general economy is strong. Despite some spotty situations in automotive and textile areas, the overall outlook for continued stability in business activity and employment appears good. Serious strikes in major industries seem remote, with the possible exception of steel. And, even in that field prospects for a peaceful settlement may be improving.

• Mortgage money is available. Some banks are advertising the availability of mortgage funds. Savings and loan associations expect their savings to increase $6 billion this year, making more money available for mortgage loans. Mortgage lending by mutual savings banks in both January and February was above year-ago levels. Commercial banks lent 15% more money on mortgages in January of this year than they did in January '55. The Voluntary Home Mortgage Credit Program, which facilitates home financing in small communities, currently is placing loans at an annual rate of $200 million a year as against $128 million in its first year of operation. And, for the longer term, trustees of welfare funds are becoming



Record Mark

increasingly interested in the investment possibilities of mortgages.

• The Eisenhower Administration wants to sustain the housing boom in an election year. Two steps taken were the recent easing of mortgage terms and the continued heavy buying of mortgages by Fannie Mae.

There are several encouraging notes in the field of government-insured housing loans. Discounts on FHA mortgages have been narrowing in recent weeks, reflecting some easing of the mortgage market, according to official FHA reports. On GI loans, the Veterans Administration reported appraisal requests for proposed construction jumped 27% from January to February, although they were still well under a year ago.

Recent modifications of FHA regulations pertaining to cooperative housing are expected to spur construction of housing for the middle-income groups by permitting insurance of mortgages up to 90% of the cost of the projects (95% if veterans make up 65% of the membership) with repayments running up to 40 years.

• The housing outlook is also aided by the continued expansion of industrial building, particularly new plant construction in areas that are away from the previously-established industrial sections. As new jobs are created in these localities, housing is needed for the workers.

• Demand for larger homes is another factor. Many families have outgrown the one- and two-bedroom houses of the early postwar period.

• Materials needed in homebuilding, such as cement, gypsum products and aluminum are generally in better supply because of expansions within these industries.

• More people plan to buy new homes this year than last, according to the annual University of Michigan survey of consumer buying intentions.

• And, builders are planning to put up more units. The backlog of housing for the first two months of this year is 3% greater than it was in January and February of 1955.

• **There's a dark side too**—That's the bright side of the housing picture. But there are also some offsetting factors

(Continued on page 115)

Mass Housing Contracts by Region, First Quarter 1956 and 1955

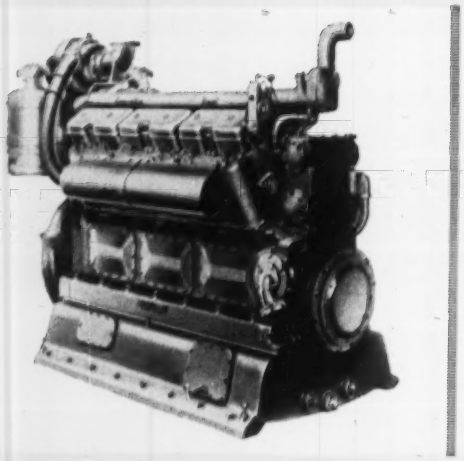
Reported to Engineering News-Record, in millions of dollars

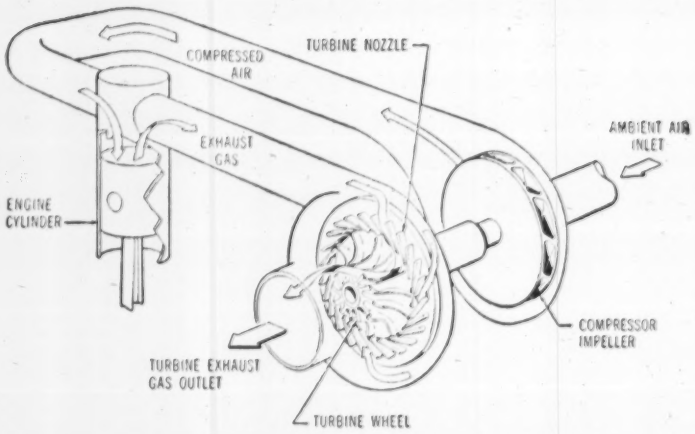
Region	Private 1956	Private 1955	Percent Change	Public 1956	Public 1955	Total 1956	Total 1955	Percent Change
1 New England	$48.9	$32.7	+49.5	$1.8	$3.6	$50.7	$36.3	+39.7
2 Middle Atlantic	579.2	641.3	−9.7	36.5	5.6	615.6	646.9	−4.8
3 South	23.1	108.2	−78.7	18.6	5.1	41.7	113.3	−63.9
4 Middle West	297.8	469.7	−36.6	21.4	15.9	319.1	485.6	−34.3
5 West of Mississippi	512.7	330.7	+61.1	17.9	1.8	530.6	334.5	+64.6
6 Far West	160.5	164.6	−2.5	6.9	11.6	167.4	176.2	−5.0
U. S. Total	$1,642.2	$1,747.2	−6.0	$103.1	$45.6	$1,745.3	$1,792.8	−2.6

Caterpillar announces a TURBOCHARGED

D397 (SERIES D) 650 HP Maximum @ 1300 RPM AND D375 (SERIES D) 430 HP Maximum @ 1300 RPM

Compact, modern heavy-duty diesels for greater power, efficiency and economy!





The Cat D397 Turbocharged Engine

Both the D397 and the D375 are also available as *roots blown, naturally aspirated* or *spark ignited* engines.

The Turbocharger . . . Exhaust Gas and Air Flow

Another example of Caterpillar leadership in action! The Turbocharger, driven by the engine exhaust, utilizes energy which would otherwise be lost. It packs air into the engine according to engine *load* for greater efficiency.

As shown in the diagram above, engine exhaust gases turn the turbine, which drives the compressor . . . the compressed air then enters the cylinders. Final result: more power on less fuel.

More than eighteen years of research have gone into these two new CAT* Turbocharged Diesels. Incorporating metallurgical, mechanical and aerodynamic advances, they are engineered to deliver higher horsepowers and lower operating costs at reduced noise levels. Their advance-design features are also available in D397 and D375 Electric Sets and Marine Engines.

With these engines in the Caterpillar line-up, you now have an even wider choice of compact, modern heavy-duty power to meet your requirements. Get the complete facts about these two new Turbocharged Diesels from your Caterpillar Dealer!

Caterpillar Tractor Co., Peoria, Ill., U.S.A.

CATERPILLAR*

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MODERN HEAVY-DUTY DIESELS

that could put a damper on this year's housing market. Some of the main ones:

• Some experts believe that homebuilding has been overextended. They point to the fact that outstanding mortgages reached an all-time high as of December '55, with $89 billion tied up in housing for one-to-four family homes and another $33 billion outstanding in mortgages for multi-family housing and commercial properties. And, they point to the rising vacancy rates on rental properties which moved up from 1.8% in the second and third quarters of '55 to 2.2% in the last quarter.

• Another factor that could slow down housing is the rising cost of construction. ENR's Building Cost Index for April is running 5.4% above a year ago.

• Some materials shortages, such as structural steel, could cut construction of multi-unit housing.

• The growing scarcity of cheap land near major cities and transportation lines could have a real effect. The cost of the land itself, plus higher improvement costs, might restrict some of the project builders.

But, on balance, this still looks like an excellent year for homebuilders. A new surge in the second quarter could turn the 1956 homebuilding "slump" into a bigger boom than 1955. It makes the next three months well worth watching.

Structural Steel Assured For Canada House in N. Y.

The 26-story Canada House skyscraper in New York City will have a steel frame after all, J. B. Carswell, general manager of Canada House, announced last week.

An agreement with the American Bridge Division of U. S. Steel will permit construction of an all-steel skeleton as originally planned.

Some consideration had been given to the use of reinforced concrete for the structure when it was believed that steel delivery delays could hold up the construction schedule. It would have been one of the tallest reinforced concrete buildings ever constructed.

The architects, Eggers & Higgins, together with structural engineers Severud, Elstad & Krueger and mechanical engineers Syska and Hennessy, are currently preparing the final working drawings.

Demolition of two six-story buildings at the site is proceeding on schedule according to the general contractor, Walsh Construction Co.

Big Contractor's Best Year

Morrison-Knudsen nets $6-million profit on $184 million of gross income in its 1955 operations

How far contracting—or at least one contractor—has advanced into the realm of big business is dramatically illustrated by the 1955 annual report of Morrison-Knudsen Co., Boise, Idaho.

Morrison-Knudsen had a total volume of construction contracts under way in 1955 slightly in excess of $681 million. It completed $255 million of this, and so has $426 million of work carrying over into 1956—more than twice the backlog with which it started 1955.

For the jobs worked on in 1955, M-K received a total income of $184 million on which it made a 3.4% profit of $6 million. This is the largest net profit dollarwise in the company's history, although total income has been larger in three other years, the biggest, in 1951, being $243 million on which 2.2% profit was realized.

Harry W. Morrison, president, noted in his report to the company's 3,619 stockholders that more than 200 separate contracts were being worked on in 1955. He called attention to the fact that construction materials costs averaged 5.5% higher and that wage scales increased, but that "being organized to rapidly expand the volume of our operations" earnings were maintained at a "favorable level."

M-K, Morrison reported, purchased over $11 million worth of equipment in 1955, a portion of which was financed on a three-year basis. These purchases represented an increase over previous years because "we anticipate that the equipment delivery situation will become increasingly acute" on account of an expanded highway program.

The company's total equipment investment, valued at $30 million original cost, stands on the books at $16 million. Total units owned by the parent corporation are 4,396.

Equipment purchases have averaged more than $5 million a year for the past five years, so that the step-up to $11 million in 1955 was substantial.

Because, as Morrison emphasized, equipment represents M-K's largest single item of capital investment and in view of such new mechanical improvements as torque converters, turbochargers and the like, the company instituted in 1955 a series of training programs for master mechanics, journeymen mechanics and certain of its mechanic helpers. The men are given intensive eight-week courses by company supervisors and specialists from the equipment manufacturers.

Morrison-Knudsen's operations are reflected in four categories, the parent corporation, domestic subsidiaries, foreign subsidiaries and joint ventures. In 1955, the parent company had $286 million of contracts in force and completed $94 million. Domestic subsidiaries had $156 million in force and completed $69 million. Foreign subsidiaries had $238 million in force and completed $92 million. Uncompleted volume carried over into 1956 for the three categories are $192 million, $87 million and $146 million respectively.

Of the parent company's completed construction volume in 1955, half was handled as joint ventures with other construction companies. There were 26 of these joint venture contracts.

Principal domestic subsidiary is the H. K. Ferguson Co., Cleveland, which handled 60 contracts and completed work valued at $58 million. It has a $68-million backlog for 1956. Other domestic subsidiaries are International Engineering Co., San Francisco, and the Selby Drilling Co. and the Broadway Holding Co. of Boise, Idaho.

In the foreign field M-K has subsidiaries in Peru, Venezuela, Pakistan, Colombia, Guatemala, New Zealand, Brazil, Afghanistan, Australia, Iraq, Alaska, Mexico and Canada. In addition to these countries, the company also operated in 1955 in Korea, Indonesia, Iran, Turkey, Morocco, England, France, Belgium and the Philippine Islands.

Among 1955's completed foreign contracts was the Santo Tomas Port Development in Guatemala.

New contracts started in 1955 included the 102-mile Basrah-Amara Highway in Iraq, rehabilitation of war-damaged Hwachon Dam in Korea, enlargement of the Manila Airport and a cement plant in Indonesia.

Outstanding jobs under construction in 1955 included the 390,000 kw Cubatao power plant in Brazil, set in an underground chamber 394 ft long, 141 ft high and 66 ft wide; a diversion tunnel for the Brownless rockfill dam project in Hell's Canyon.

(B&F continued on page 116)

SAC Speeds Family Housing Program

The Strategic Air Command has launched a program of family housing construction under the Capehart Amendment that will total more than $157,194,000.

The initial work, which is the first under the new public law involving both SAC and the Air Force, is at Abilene Air Force Base, Texas. The project there calls for the construction of 944 units of family housing at a cost of $12.6 million.

The contract was awarded March 27 to the firm of C. H. Ponder & Dan Ponder of El Paso. Because of the urgent need for housing, the firm started work the same day.

• **Fourteen bases to get units**—The job is the Capehart Amendment's leadoff project in a program that will bring 11,644 units of family housing to 14 air bases. In addition, some other projects are still under study.

The others, all less advanced than Abilene's, are: Altus (Okla.), 700; Clinton-Sherman (Okla.), 500; Dow (Maine), 685; Fairchild (Wash.), 50; Forbes (Kans.), 640; Homestead (Fla.), 1,570; Little Rock (Ark.), 1,535; Lockbourne (Ohio), 400; Plattsburg (N. Y.), 1,685; Portsmouth (N. H.), 1,700; Smoky Hill (Kans.), 535; Travis (Calif.), 500, and Westover (Mass.), 200.

As in the now-expired Wherry Housing Act that preceded it, the Capehart Amendment enlists private enterprise to provide quickly the housing that for SAC is one of its most important needs. It avoids both the long way around of getting Congressional appropriations and of obligating the tax dollar.

The Capehart Amendment differs from the Wherry Act. In some fundamental respects under the Wherry Act, the builder operated the housing after its construction. Under Public Law 345, the builder gets his money out of construction and steps out as soon as the job is completed. The government takes over the mortgage. It, in turn, amortizes the cost by withholding the rental allowance—which averages $90 monthly—of Air Force families occupying the units. The cost limits vary also; the Wherry maximum was $9,000 per unit while the Capehart Amendment permits units averaging $13,500 in cost.

As the nation's bellwether project, the Abilene job stands as a case history of how SAC will apply the amendment to a housing program at bases stretching from the Canadian border to Florida and from Maine to Washington.

• **Here's how it works**—Here is the step-by-step breakdown, as described by Col. C. F. Dreyer, SAC chief of installations:

The Air Force employs a firm of architect-engineers to design the complete project, which in all cases is located within the base itself. (The A-E on Abilene was the Associated Architects and Engineers of Abilene.) The plans are developed in stages. The sketches and site planning first are drafted for approval.

Next step is the development of preliminary plans and specifications which show engineering details on the roads and utilities, the general scheme for drainage and the more accurate siting of individual houses. After these are approved, the A-E develops the architectural plans and specifications.

The objective given the A-E is to design the best house possible within the $13,500 limit.

Individual units vary in cost and size, as is indicated by their square footage. Those for airmen have a 1,080 square foot limit; for warrant officers, lieutenants and captains, 1,250 square feet; for majors and lieutenant colonels, 1,400; colonels, 1,670; base commanders, 1,800, and generals, 2,100.

Cost of site development, insurance of loan, A-E fees and a certain amount of interest has to be deducted from the per house cost. This leaves about $11,500 or $12,000 available for housing construction proper.

Because of the size of the Abilene job, the project was broken down into two packages of 472 units. This was to hold the mortgageable entity to the $5-million to $6-million bracket. A larger financial parcel, it was felt, might eliminate lending agencies and lessen competition for the job.

In developing the plans and specifications, the A-E was required to work closely with the FHA because the federal agency must, before the project is advertised, issue an appraisal and eligibility statement attesting that replacement costs per unit will be within the $13,500 limitation.

The next step is the preparation of invitations to bidders, which incorporate all information pertaining to the method of financing through the construction period and subsequent to completion of construction.

• **Separate financing and construction**—Terms require the low bidder to form (separate from the construction company) another company which must arrange for financing the construction of the project with private funds that are acceptable to FHA.

The financing includes the A-E fees for design and inspection plus ½ percent insurance of loans. On completion of the project the Air Force will take over the housing and the contractor obligations for repayment of the loan. Loans will be amortized over a 25-year period.

A factor in the program nationally is that the $13,500 limitation is uniform whereas building costs vary from locality to locality.

At bases where building costs are high—Portsmouth and Plattsburg are examples—SAC is planning multiple units—to gain the economies that fewer end walls, grouping of utilities and the like bring.

At Abilene, SAC got a lot for its money. The houses have gas heat, electric air-conditioning, and mechanical garbage disposal units. Some appliances are furnished at Abilene.

• **Follow regional patterns**—Houses are designed for the region in which they are built. The New England structures will be two-story, Colonial type. In Florida, ranch-type will be built.

Efforts are being made to avoid the row housing appearance by varying color and exterior details. Placement of car ports, use of vertical and horizontal siding, variance in brick wainscoting are examples of the way this will be achieved. Construction is conventional, in keeping with FHA preference.

The Capehart Amendment expires September 30. Legislation is in the mill to extend the program and modify it. Changes would include boosting the statutory limit to $16,500 and would exclude site development room costs. SAC estimates it needs a total of 18,000 houses to care for officers and upper grade airmen, the groups with rental allowances to whom this type of housing is available.

• Aside from the Capehart projects in the work, SAC housing is limited to a few appropriated funds projects. These include 400 units at Lincoln (Neb.) AFB, 400 at Sedalia (Kans.) AFB, 200 at Lake Charles (La.) AFB and 45 senior officers' quarters at four or five other bases.

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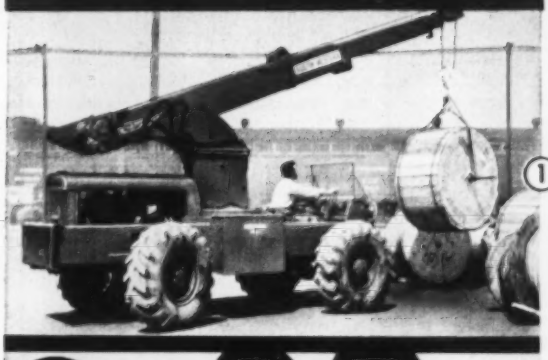

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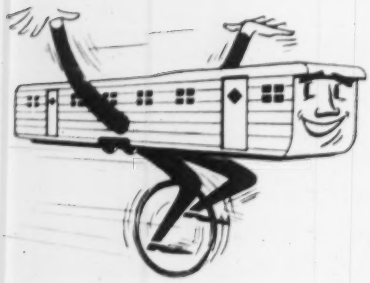

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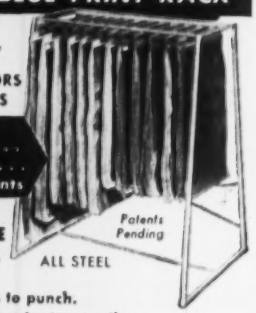

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Joint Board Starts New Year

No significant changes were made in the National Joint Board for the Settlement of Jurisdictional Disputes when the supporting agreement came up for automatic renewal last month.

Now entering its ninth year of operation, the board was jointly established by the building trades and contractors for the voluntary settlement of jurisdictional disputes in the construction industry. In addition to its quasi-judicial functions, the board encourages use of national agreements between unions for voluntary solution of conflicts. The agreement under which the board was created and functions is automatically renewed from year to year, unless changed or terminated before March 31 of any year.

For the purposes of this year's renewal, the negotiating committee—representing the AFL-CIO Building and Construction Trades Department, its affiliated unions, and the participating national contractor associations—agreed to one procedural change. Hereafter, unions not directly represented on the board but appearing before the board as an interested party in a dispute need not withdraw while the board renders a decision. Formerly, a representative of such a union couldn't be present while board members were voting.

Although the building trades' constitution, as amended last November, now makes the plan binding on all affiliates, only eight of the unions are represented on the board. Exception to the amendment was taken by the lathers union (ENR Dec. 8, 1955, p. 155) and the appeal is still pending before AFL-CIO Executive Council.

The board's role as the recognized agency for handling jurisdictional disputes was considerably strengthened last year when the U.S. Supreme Court declined to intervene in the A. W. Lee dispute between carpenters and lathers (ENR Sept. 1, 1955, p. 106). Whether that decision will stand up under the building trades' amended constitution, which makes union participation compulsory instead of voluntary remains to be seen.

Carpenters, NCA Members Look Ahead

Another step toward labor peace has been taken by the United Brotherhood of Carpenters and Joiners of America and members of the National Constructors Association.

The union has entered into identical agreements, primarily to eliminate work stoppages, with those members of NCA who wish to participate.

Nation-wide in scope, open-end as to term and concise in content, the agreements provide that:

- Jurisdictional claims of the carpenters union will be recognized. Specific reference is made to those claims established by (1) agreements with other crafts and (2) awards and decisions approved and rendered and published by the National Joint Board for the Settlement of Jurisdictional Disputes.
- It is mutually agreed that in the various areas in which he works, the employer will conform, with respect to union carpenters in his employ, to those hours, pay scales and working conditions that have been established for the union in the locality through collective bargaining.
- The union is committed to furnishing the employer competent journeymen, if and as he requests them.
- No work stoppages or strikes by union members will be called pending investigation of, and efforts to settle peacefully, any and all disputes that may arise between the union and the employer.

The National Constructors Association, with a membership of 19, is composed of engineers and builders of chemical plants, petroleum refineries, steel mills and power plants.

Guaranteed Annual Wages Win Maryland's Approval

Maryland has joined the list of states permitting integration of unemployment insurance benefits with payments under guaranteed annual wage plans.

The action—opposed last summer by the Associated Builders and Contractors of Maryland, Inc.—was taken by the Maryland General Assembly, which amended the state's unemployment compensation law to exclude GAW payments from the list of payments that constitute wages under the statute.

(*Labor continued on page 120*)

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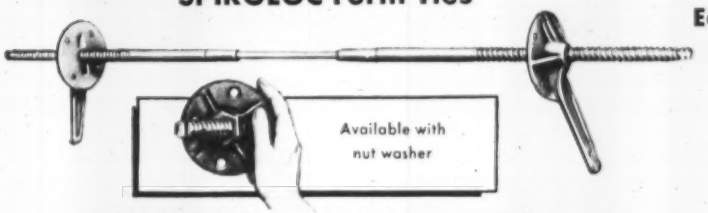

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U.S.A. CANADA

Setback for Labor

Teamsters flout law in New York while writer suffers an acid attack

Last week, elements of organized labor and public reaction to news events continued to waken the foundations of the still-infant AFL-CIO, which is constitutionally dedicated to "the interests of all the American people."

Inside the ranks of the teamsters union, the controversial alliance with the longshoremen—tied into charges of corruption and racketeering now highlighted by the bitter fight between Hoffa-backed John O'Rourke and incumbent Martin Lacey for control of the union's Joint Council in New York—kept alive the threat of ouster from the AFL-CIO as well as the possibility of a splinter movement within the union itself. Also, the public tended to link with union activities an early morning sulphuric acid attack on labor columnist Victor Riesel by an unidentified assailant in New York shortly after a radio broadcast condemning what he called racketeering by local figures in the operating engineers union. The latter has pledged its full cooperation to those investigating the incidents.

By week's end, developments in the Lacey fight had confounded confusion. O'Rourke seized the president's office and cut of Lacey's pay, despite a temporary injunction intended to keep Lacey in command until the merits of his charges of election collusion were considered by the Federal Court. A contempt citation against O'Rourke and a petition to dismiss the whole case for lack of jurisdiction are now pending. Council vice president Joseph Trerotola has been ordered to serve as acting president without policy-making power until the court decides what to do.

Speculation continued that the teamsters' activities might still result in an ouster from the AFL-CIO (ENR April 5, p. 156) and that, if this should happen, some of the local units might secede from the union. President Beck is slated to discuss the issues next week with George Meany, who has indicated he'll make the teamsters toe the line—or get out.

Meanwhile, the Riesel attack—still unsolved—has been bitterly condemned by Meany and by the president of Engineers' Local 138 to which the Riesel broadcast related.

For the trade union movement—increasingly interested in gaining public understanding and favor—the crucial question is the extent to which the guarantee of local autonomy will bow to the constitutional powers of the AFL-CIO in the promotion of morality, freedom and democracy and in the protection of the labor movement from "any and all corrupt influences."

Wage Negotiations

Some areas hit by strikes as others grant increases ranging up to 20 cents

Wage increases ranging from 10 to 20 cents and scattered strikes continue to be reported from across the nation. Here are some examples:

California—A two-year contract between masonry contractors and laborers in San Diego grants **brick tenders** a 12½ cent increase each year, making the new scale $2.625 on May 1. In the Fresno area, construction has been hit by a **plasterers'** strike, with the union seeking a 10-cent increase in basic rates plus 5 more cents for health and welfare; employers, hopeful of keeping costs comparable to lath and plaster substitutes, have offered a 2½-cent increase with another 2½ cents for a plaster promotion fund.

Connecticut—A three-year contract gives **painters** in the Bridgeport area annual increases of 15, 10 and 10 cents, making the present scale $3.00. **Sheet metal workers** in all counties but two have agreed to a one-year contract granting a 10-cent boost now plus a new 7-cent pension contribution in October.

Illinois—In Springfield, laborers have won a 10-cent increase (new scale is $2.35) under a one-year contract and **cement finishers** an annual increase of 10 cents (new scale is $2.05) under a two-year contract. **Carpenters**, now getting $2.82½, have struck for 22½ cents and a one-year contract.

Massachusetts—The AGC and Boston BTEA have agreed to two-year contracts granting **carpenters** 20 cents and **laborers** 15 cents each year. Carpenters, whose new scale is $3.05, also had welfare contribution boosted to 10 cents; new laborers' scale is $2.30.

New Mexico—Under a two-year contract with AGC, **iron workers** received a 15-cent increase April 1 and will get another 12½ cents next year. Albuquerque **sheet metal workers**, now getting $3.00 plus 7½ cents for welfare, struck for a two-year contract that would grant annual increases of 25 cents, seven paid holidays and 2½ cents more for welfare.

OFFICIAL PROPOSALS

Bids: May 3, 1956

City of Elizabeth, New Jersey

NOTICE TO BIDDERS

Sealed proposals for the construction of Alterations and Additions to the Sewerage System will be received by the Board of Public Works of the City of Elizabeth, New Jersey, at a meeting to be held in the Council Chamber at the City Hall at 2:00 P.M., Eastern Daylight Saving Time on Thursday, May 3, 1956, and then publicly opened and read. No proposal will be accepted after said hour. Proposals will be received on each:

Contract 5A: Easterly Intercepting Sewer Pine Street to Trumbull Street And Storm Water Regulator Chambers

Contract 5B: Easterly Inter... ting Sewer Trumbull Street to Humboldt Avenue

Information for Bidders, Proposal forms, specimen Contract, Plans, Specifications and other pertinent Contract Documents for any or all of the foregoing contracts may be examined at the office of Henry Kreh, Jr., Consulting Engineer, 433 N. Broad St., Elizabeth, N. J. Alexander Potter Associates, Associate Engineers, 50 Church St., New York, and at the office of the City Engineer, City Hall, Elizabeth, N. J., between the hours of 10 A.M. and 4 P.M. daily except Saturdays, Sundays and holidays and there obtained upon making a deposit of Fifty ($50.00) dollars, which will be refunded to bidders within thirty (30) days after the proposals are opened and upon return of the data undamaged. Half of this deposit will be refunded to non-bidders.

Extra copies of specifications may be obtained at the cost of Ten ($10.00) dollars each and extra sheets may be obtained at the cost of One ($1.00) dollar each which sums will not be refunded.

Bidders may submit proposals on either one or both contracts.

The scope of work under each contract is as follows:

CONTRACT 5A:

Approximately 2600 lineal feet of 54-inch diam. reinforced concrete pipe sewer; 100± lineal feet of 48-inch diam. reinforced concrete pipe sewer; three (3) Storm water regulator chambers; miscellaneous appurtenances and items of work as required for a complete project.

CONTRACT 5B:

Approximately 2700 lineal feet of 42-inch diam. of reinforced concrete pipe sewer; 400± lineal feet of 48-inch diam. reinforced concrete pipe sewer; 625 lineal feet of 30-inch reinforced concrete pipe sewer; 350± of underecrossing under tracks of N. J. Central Railroad; and miscellaneous appurtenances and items of work as required for a complete project.

Prospective bidders will be required to fill in answers in Questionnaire of Financial Statment which is authorized by State Law and which must be approved by the Board of Public Works before bidders are eligible for bidding. Questionnaire forms may be obtained at the office of the City Engineer.

No proposal shall be considered unless accompanied by a bid bond of a corporation acceptable to the City, or a cashier's check or a certified check upon some good and acceptable bank, in the penal sum of 10% of the total amount of each bid as a guarantee that if the contract upon which the bidder has bid shall be awarded to said bidder, he will enter into a contract for the work and do so within the time stipulated in the Notice of Award for said work and failing to do so the bidder and surety shall forfeit to the City of Elizabeth, the amount of said Bid Bond or check. The Bid Bond shall be executed by the bidder and surety company on form furnished by the City.

A bidder to whom a contract is awarded shall furnish a Performance Bond on a surety company duly licensed in the State of New Jersey, in the sum of 100 per cent of the amount of the contract, conditioned upon the faithful performance of the terms of the contract.

The successful bidder will be required to comply with all State Laws governing the execution of Municipal contracts in the State of New Jersey.

The Board of Public Works reserves the right to reject any and all bids as it may deem best for the interests of the City of Elizabeth, and to waive any informality in the bid.

BY DIRECTION OF THE
BOARD OF PUBLIC WORKS.
Robert S. Everett
Clerk, Board of Public Works.
April 5, 1956

OFFICIAL PROPOSALS

Commonwealth of Massachusetts, Metropolitan District Commission. Sealed bids or proposals will be received by the Metropolitan District Commission at its office, 20 Somerset Street, Boston, until 1:00 P.M., Thursday, April 26, 1956, and at that time and place will be publicly opened and read. The work to be done consists of Reconstruction of Squire's Bridge, Monsignor McGrath Highway, Somerville. Charge for specification is $25.00 which amount is returnable only to bidders. Proposal guarantee shall consist of a certified check for $65,000.00 payable to the order of the Commonwealth of Massachusetts. Attention is called to the minimum rates of wages to be paid on the work as determined by the Commissioner of Labor and Industries under the provisions of Chapter 461 of the Acts of 1935. Complete information may be obtained from the office of the Commission. The right is reserved to reject any or all proposals. By: Charles W. Greenough, Commissioner. March 27, 1956.

Bids: April 25, 1956

Indiana Toll Road Commission
309 W. Washington Street
Old Trails Building
Indianapolis, Indiana

NOTICE TO BIDDERS

Contract T.S.-2

Sealed proposals will be received by the Indiana Toll Road Commission at or before 10:00 A.M., Central Standard Time, April 25, 1956 for the performance of the contract enumerated above.

Contract T.S.-2, Trail Blazer and Incidental Signs, consists of furnishing materials, fabricating trail blazer signs, incidental warning signs, incidental information signs, timber sign supports and aluminum tripod sign supports, and the delivery of the signs and sign supports to the LaGrange Maintenance Building District No. 4) which is located in LaGrange County at the intersection of Olney Road with the Indiana (East-West) Toll Road.

Copies of the Plans, Standard Specifications, Supplemental Specifications for Trail Blazer and Incidental Signs and Proposal Forms for said Contract are available for public inspection or purchase at the office of the Chief Engineer, Indiana Toll Road Commission, 309 W. Washington Street, Indianapolis, Indiana. These documents may be purchased from said Chief Engineer for the following sums, per set, which sums are non-returnable:

Standard Specifications for the Indiana East-West Toll Road	$5.00
Plans and Supplemental Specifications for Trail Blazer and Incidental Signs	$3.00
Proposal Forms	$1.00

All proposals must be on the form prescribed by the Commission and must comply with the terms and conditions set forth in the Contract Documents.

Contractor's statement for qualification on the forms supplied by the Commission will be required from all Bidders.

Each Proposal must be accompanied by a Proposal Guaranty in the amount of five (5%) per cent of the total price bid for the contract. The Proposal Guaranty shall be in the form of an acceptable surety bond or certified check on a solvent bank.

If the Bidder is an out of state corporation, he shall be required to furnish a certificate from the Secretary of State of Indiana as evidence that the corporation has complied with the Indiana Foreign Corporation Statutes, and that the corporation is authorized to transact business in the State of Indiana.

All bids must be received at or before 10:00 A.M., Central Standard Time, April 25, 1956, in the offices of the Indiana Toll Road Commission, 309 W. Washington Street, Indianapolis, Indiana. At said hour, the bid box will be publicly opened and the bids read.

The award of the above Contract, if any award be made, will be to the Bidder whose Proposal is lowest and best for the performance of the work, taken as a whole, and complies with all the prescribed requirements. The Commission reserves the right to reject any or all Proposals and to waive technicalities.

INDIANA TOLL ROAD COMMISSION
Dr. Dillon Geiger
Charles W. Keating — Chairman
Secretary-Treasurer

OFFICIAL PROPOSALS

Bids: April 24, 1956

Contract NYA-220.012

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NEW YORK INTERNATIONAL AIRPORT
SECOND FEEDER FOR ASR-3
INSTALLATION AT RUNWAY 4-22

Sealed proposals for the furnishing and installation of the Second Feeder for ASR-3 Installation at Runway 4-22 will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1160, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, April 24, 1956, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Engineer of Design of the Authority, Room 1112, and copies will be furnished upon request. No deposit will be required but the documents shall be returned in good condition not later than forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman
New York, April 12, 1956

Bids: May 1, 1956

Port of New Orleans

ADVERTISEMENT

Sealed bids will be received by the Board of Commissioners of the Port of New Orleans at their office, Room 204, No. 2 Canal Street, until Tuesday, May 1, 1956, at 2:00 o'clock P. M., and then publicly opened for furnishing 6000 to 15000 tons of steel bearing piles.

Deposit of three per cent of the sum bid, by certified check only, certified by an accredited officer of an accredited bank, is required with each bid.

A surety bond, in acceptable surety company, in the amount of the contract, is required with notarial contract.

Specifications and bid forms are on file in the Board's office mentioned above. Complete sets will be furnished to prospective bidders on application.

The right is reserved to accept or reject any or all bids and to waive informalities, and to award a contract or contracts as the Board may determine to be for its best interests.

U. S. Government

GOVT. OF DIST. OF COL., DEPT. OF SAN'Y. ENG'G., Mch. 22, 1956. SEALED PROPOSALS will be recd. in Rm. 404, 499 Pa. Ave., N.W., Wash. 1, D. C., until 2 P.M., DST, May 8, 1956, and then publicly opened and read for Sewage Treatment Plant Additions, Secondary Treatment Plant, Unit 22, First Half, consist. of constr. of Blower Bldg., New Aeration Tanks, New Final Sedimentation Tanks, Final Tank Gallery, Conduits, Tunnels, New Power Substation, and appurtenant work at the Sewage Treatment Plant of D. C., Blue Plains. Proposal forms, plans and specns. obtainable from Supervisor, Contr. & Bond Section, Procurement Office, D. C., Rm. 406, 499 Penn. Ave., N.W., upon deposit of a certified check for $50.00 per set, payable to Collector of Taxes, D. C. (Tel. NA 8-6000, Ext. 2378).

Sealed bids for construction of the U.S. Post Office & Court House, Nome, Alaska, will be received until 3:00 P.M., Pacific Standard Time, May 8, 1956 in Rm. 126 Federal Office Bldg., 909 First Ave., Seattle, 4, Washington. Three sets of bidding material may be obtained without deposit; additional sets require $50.00 deposit each. Request should be made to the Deputy Regional Director, P.B.S., General Services Administration at the above address or Public Building Service, Rm. 1201, General Services Bldg., 18th & F Sts., N.W., Washington, D. C. Fred S. Fearman, Deputy Commissioner of Public Buildings, General Services Administration.

OFFICIAL PROPOSAL

RATE: $2.10 per line (or fraction) per insertion.

CLOSING DATE: 10:30 a.m. Friday for issue out following Thursday.

SEND COPY: Official Proposal Division, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.

OFFICIAL PROPOSALS

Bids: May 10, 1956

New York State Road Works

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Highway Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A.M., advanced standard time, which is nine-thirty o'clock A.M., eastern standard time, on the 10th day of May, 1956, by Henry A. Cohen, Director, Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Estimated Deposit	Cost of Work
DISTRICT No. 1, G. L. Nickerson, District Engineer, 353 Broadway, Albany, N. Y.						
Warren	R.C. 56-9	Lake George Village, S.H. 5068 Lake George–Warrensburg, S.H. 5227	0.14	Asp. Conc., Opt. = 0.07 Mi. Misc. Work ..... = 0.07 Mi. 22' R.C. Slab Br.	$1,000 Plans $10	$74,000
DISTRICT No. 2, Lacy Ketchum, District Engineer, 109 No. Genesee St., Utica, N. Y.						
Hamilton	FARC 56-81	Hope Center-Wells, Pt. 2, S.H. 5268 Wells-Speculator, Pt. 1, S.H. 5514 Proj. F-1036(4)	3.49	9" Cem. Conc. Pavt. 22' Wide = 3.47 Mi. Misc. Work = 0.02 Mi. R.C. Slab Br. 20'	$39,000 Plans $15	711,000
Herkimer	FARC 56-25	Mohawk–Jacksonburg–Little Falls, S.H. 8401 Project F-517(4)	3.38	Asph. Conc., Opt.	$23,000 Plans $15	421,000
Herkimer	FARC 56-10	Cedarville–West Winfield, S.H. 871 Project S-469(1)	1.51	Asph. Conc., Opt.	$12,000 Plans $10	212,000
Madison, Oneida & Chenango	FARC 56-14	Sherburne–Furman Mill, S.H. 705 Furmans Mills–Hubbardsville, S.H. 8297 Hubbardsville–North Brookfield, S.H. 8203 North Brookfield–Waterville, S.H. 840 Project F-456(7)	7.88	Asp. Conc., Opt. = 7.79 Mi. Misc. Work ..... = 0.09 Mi.	$65,000 Plans $25	1,140,000
Montgomery	FARC 56-11	Fonda, East, S.H. 152 Fonda–Tribes Hill, S.H. 303 Mohawk River Turnpike, Amsterdam–Tribes Hill, S.H. 108 Project F-349(11)	4.41 (1.31) (Acc.)	9" Cem. Conc. Pavt. 24'–48' Wide = 4.30 Mi. Asph. Conc., Opt. = 1.16 Mi. T.C. Graded Grav. = 0.26 Mi.	$90,000 Plans $25	1,642,000
DISTRICT No. 3, William Robinson, District Engineer, Weigh Lock Building, Syracuse, N. Y.						
Cayuga	FARC 56-12 FASH 56-1	Auburn–Weedsport, S.H. 1317 Village of Weedsport: Seneca St. Proj. F-1114(1)	7.24	Asph. Conc., Type 1A	$63,000 Plans $15	1,146,000
Cayuga	FARC 56-19	Groton–Lock–Moravia, S.H. 1016 Project F-610(6)	6.55	Asph. Conc., Type 1A 2 R.C. Closed Box Brs. 46' & 55.5' 1 Timber Trestle Ext. 45.2'	$54,000 Plans $15	985,000
Oswego	FARC 56-99	Pulaski–Williamstown, Pt. 1 & Pt. 2, S.H. 1288-972 Project F-533(4)	10.20	Asph. Conc., Type 1A	$50,000 Plans $25	906,000
Oswego	FASS 56-2	Swamp Road (Co. Rd.) Project S-448(1)	3.58	Bit. Mac., Opt. Rd. Mix	$18,000 Plans $10	332,000
Seneca	FARC 56-20	Interlaken–Trumansburg, S.H. 5446 Project F-494(2)	3.98	Asph. Conc., Opt.	$23,000 Plans $10	398,000
Seneca	FASS 56-1	Town Line Road, C.R. 138 Project S-386(1)	1.78	Asph. Conc., Opt.	$9,500 Plans $10	175,000
Seneca	FARC 56-23	Geneva–Waterloo, Pt. 2 & 3, S.H. 8240 Waterloo Village: Main St., S.H. 5709 Waterloo Village: Main St., Pt. 2, S.H. 9252 Waterloo Village, S.H. 1211 Project F-406(3)	1.54	Asph. Conc. Type 2A = 1.44 Mi. Misc. Work ..... = 0.10 Mi.	$37,000 Plans $10	635,000
DISTRICT No. 4, B. F. Perry, Acting District Engineer, Barge Canal Terminal, Rochester, N. Y.						
Genesee	FAC 56-14	Batavia City: Oak Street Arterial (Main St. to North City Line) Project U-893(2)	1.11	Asph. Conc., Type 2A = 0.92 Mi. Widening & Misc. Wk. = 0.19 Mi.	$25,000 Plans $15	467,000
Wyoming	FARC 56-94	Warsaw–Gainesville, S. H. 5400 Project F-380(7); S-177(2)	3.18	Asph. Conc., Opt. = 3.13 Mi. Misc. Work ..... = 0.05 Mi. I-Beam Br. 41'	$40,000 Plans $25	696,000
DISTRICT No. 5, E. G. H. Youngmann, District Engineer, 65 Court St, Buffalo, N. Y.						
Erie	FAC 56-2	City of Tonawanda: Seymour St. Project U-1078(7)	0.34	Asph. Conc., Type 2A = 0.31 Mi. Misc. Work ..... = 0.03 Mi.	$9,000 Plans $10	159,000
Niagara	FAC 56-18	Walnut Street Arterial (Washburn Street to Pound St.); City of Lockport Project U-709(5)	0.42	Asph. Conc., Opt. = 0.40 Mi. Misc. Work ..... = 0.02 Mi.	$10,000 Plans $10	183,000
DISTRICT No. 6, J. H. Thomas, District Engineer, 30 W. Main St., Hornell, N. Y.						
Allegany	FARC 56-26	Canaadea–Fillmore–Hume, S.H. 5518 Fillmore–Portageville, Pt. 1 & Pt. 2, S.H. 9210–8228 Project F-380(5)	3.53	9" Cem. Conc. Pavt. 22' & 38' Wide = 3.51 Mi. Misc. Work ..... = 0.02 Mi. Comp. I-Beam Br. 127'	$45,000 Plans $15	818,000
DISTRICT No. 7, R. W. Sweet, District Engineer, 444 Van Dusee St., Watertown, N. Y.						
Clinton	FARC 56-22	Cadyville–Moffitsville, S.H. 822 West Plattsburg, S.H. 776 Proj. F-645(2)	8.69	Asph. Conc., Opt. 2 Closed Box Brs. 22' & 24'	$73,000 Plans $50	1,318,000
DISTRICT No. 8, J. S. Bixby, District Engineer, Pleasant Valley Road, Poughkeepsie, N. Y.						
Columbia	FARC 56-13	Chatham–Chatham Center Pt. 1 & Pt 3 & Pt. 2, S.H. 1563–342 Chatham Center–Riders Mill's, S.H. 827 Project S-370(2)	4.19	Asph. Conc., Opt.	$34,000 Plans $15	605,000
Orange	FARC 56-15	Port Jervis–Sullivan County Line, Pt. 1, S.H. 412 Port Jervis–Mongaup, S.H. 8424 Project F-502(15)	2.63 (0.50) (Acc.)	9" Cem. Conc. Pavt. 24' Var. Wide = 2.61 Mi. Misc. Work = 0.02 Mi. (Cem. Conc. Pavt. Acc. Rd. = 0.26 Mi.) (Asp. Conc., Opt. Acc. Rd. = 0.24 Mi.)	$38,000 Plans $15	697,000
Rockland	PIP 56-2P	Palisades Interstate Parkway Sect. 2 & Pt. 1 (Route 59 to Route 45)	5.77	8" Cem. Conc. Pavt. 2 @ 24' Wide	$110,000 Plans $50	1,966,000
Rockland	PIP 56-3P	Palisades Interstate Parkway Sect. 2 (N.J. State Line to Rte. 303)	2.37 (0.43) (Acc.)	8" Cem. Conc. Pavt. 2 @ 24' Wide	$50,000 Plans $25	965,000
Ulster	FARC 56-16	Wurtsboro–Ellenville, S.H. 8080 Project F-38(2)	4.19	Asph. Conc., Opt. Ext. Exist. 22' Slab Br.	$25,000 Plans $10	455,000
DISTRICT No. 9, F. J. Weber, Acting District Engineer, 71 Frederick St., Binghamton, N. Y.						
Delaware	FARC 56-17 R.C. 56-18	Andes–Margaretville, S.H. 8017 Margaretville–Halcottsville, S.H. 5384 Project S-459(1)	0.48	9" Cem. Conc. Pavt. 32'–40' Wide = 0.36 Mi. Asph. Conc., Opt. = 0.09 Mi. Misc. Work = 0.03 Mi.	$16,000 Plans $15	306,000
Chenango	FARC 56-21	Sherburne–Earlville, S.H. 5568 Earlville–Hamilton, S.H. 5585 Project F-691(4)	4.50	9" Cem. Conc. Pavt. 24' Wide 2 Comp. I-Beam Brs. 57' & 65'	$75,000 Plans $25	1,365,000
Otsego	FARC 56-24	East Springfield–Cherry Valley, S.H. 934 Cherry Valley–Sharon Springs, Sharon Springs–Canajoharie, Pt. 1, S.H. 8064 Project F-65(4)	6.54	Asph. Conc., Type 1A	$30,000 Plans $10	531,000
DISTRICT No. 10, M. E. Gort, District Engineer, Montauk Highway at Little East Neck Rd., Babylon, L. I., N. Y.						
Bronx	Fiebe 56-1	Cross Bronx Expressway Contract 7 (Fulton Ave. to Longfellow Ave.) Project IN-1084 (23)	1.00 (1.84) (Acc.)	9" Cem. Conc. Pavt. with Carbon Black 2 @ 36' Wide = 0.82 Mi. Misc. Work = 0.18 Mi. (Acc. Rd. Cem. Conc. Pavt. = 0.28 Mi.) (Acc. Rd. Sheet Asph. = 1.56 Mi.) 4 Hy. Sep. Rig. Frames, 98', 84.5', 99' & 99' 1 Hy. Sep. R.C. Arch 110.4' 1 Hy. Sep. Steel Girder 116.4'	$150,000 Plans $100	8,375,000
Bronx	Fiase 56-1	Arthur V. Sheridan Expressway Contract 1 Project IN-1086(2)	0.93	Demolition of Buildings	$9,000 Plans $10	170,000
New York	CBE RC 56-2	Cross Bronx Expressway (Highbridge Interchange Cont. 13C) Fae Be 50-1	0.13	Remove Exist. Reinf. Conc. Pavt.; Asphalt Conc., Opt. and Misc. Work	$1,300 Plans $10	25,000

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts and Accounts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specification, and contract agreement, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "STATE OF NEW YORK, COMMISSIONER OF TAXATION AND FINANCE" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding-check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instructions to Bidders."

When optional types are permitted on contracts with federal funds, bidders must state in the space provided in the proposal the exact designation of the optional type upon which the proposal is predicated.

The right is reserved to reject any or all bids.

JOHN W. JOHNSON
SUPT. OF PUBLIC WORKS

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The Advertisements in this section include all employment opportunities—executive, management, technical, selling, office, skilled, manual, etc.

Positions Vacant | **Civil Service Opportunities . . .** | **Employment Agencies**
Positions Wanted | **Selling Opportunities Wanted** | **Employment Services**
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And many other openings.

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P-1350, Engineering News-Record
330 W. 42 St., New York 36, N. Y.

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Resident Engineer, Field Engineers, Designers and Draftsmen. Pleasant working conditions. Interesting projects. Qualified graduates may apply in person or write fully stating education and experience.

D. B. STEINMAN, Consulting Engineer
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Consulting Firm in active general practice now staffing for design-construction phases toll road and general assignments; receiving applications from experienced expressway designers: highway designers and draftsmen; structural and staff engineers. Immediate assignments Chicago Area. Confidential resume to

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Experienced Chiefs of Parties.
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New Advertisements

received by April 16th will appear in the April 26th issue subject to limitations of space.

Classified Advertising Division
ENGINEERING NEWS-RECORD
330 West 42nd St. **New York 36, N. Y.**

ENGINEERS—DESIGNERS—DETAILERS

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Paid vacations and holidays, insurance and retirement plan.

Please give detailed personal and experience record, references and salary expected in application letter.

Hazelet & Erdal, Consulting Engineers
Dixie Terminal Bldg.
Cincinnati 2, Ohio

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

The Canon City Metropolitan Sanitation District, Canon City, Colorado, wishes to contact qualified, experienced and competent sewage treatment plant operator of a new sewage disposal plant. The plant will be completed by late fall or early winter, operator's services begin in early summer, during construction of plant. Address all communications to: Geo. A. Wadleigh, Secretary Canon City Metropolitan Sanitation District P. O. Box 150 Canon City, Colorado.

Designers & Draftsmen—structural, mechanical & electrical. For work on industrial buildings & power plants. Long range program, top salaries, advancement & vacations. Marbarry Corp., 140 Nassau St., N.Y.C. COrtlandt 7-0322.

Engineers experienced in water and sewage works projects or related fields. Opportunity for permanent connection with long established consulting firm. Please state full qualifications, experience, references and salary requirements. Location Ohio. P-9518, Engineering News-Record.

Old Established firm wants engineer & estimator for diversified general construction: schools, airports, sewage disposals. Must be able to take charge in field and do estimating work. Age 30-45. Must be top man. Permanent position. Salary open. Reply P. O. Box 330, Warren, Ohio.

Municipal Engineer: Chief Engineer wanted to be in charge of Engineering Division of Public Works Department for sewer and street design layout and inspection of construction. Salary range $7,100.00 to $9,100.00. State qualifications and experience. P-1244, Engineering News-Record.

Reinforcing Steel detailer wanted by fast growing Bar Fabricator. Excellent salary and good chance for advancement. Two to three years experience preferred. Send resume or phone York, Pa. 7741, Brocker Mfg. & Supply Co.

Engineer—Civil man, 30 to 45, with degree in civil engineering and experience in structural drafting and crane design as assistant chief engineer for progressive Milwaukee company. Selling, supervision, design, and drafting involved in this position. The man we want must have qualifications to become chief engineer within a few years. Salary to start $600.00 with many benefits. P-1251, Engineering News-Record.

SPECIFICATIONS WRITER

A leading international industrial engineering company has immediate opening available for an experienced building specification writer.

Applicants should possess at least five years experience writing building specifications for material purchases and subcontract specification for all building trades.

This is a permanent position offering good starting salary, all fringe benefits, good working conditions, high management cooperation, and opportunity for advancement.

Please submit a complete resume stating education, experience, salary requirement, and earliest date available to:

The H. K. FERGUSON COMPANY
ENGINEERS AND BUILDERS
1783 East 11th St., Cleveland 14, O.

EXPERIENCED ESTIMATORS

on Petroleum and Chemical Plants at our Cambridge, Massachusetts, office

Permanent position: Excellent Employee Benefits

Please send resume stating salary desired

BADGER MANUFACTURING COMPANY
230 Bent Street, Cambridge 41, Mass.

POSITIONS VACANT

Civil Engineer I $4446-$5356. Graduate degree in Civil or Mechanic Engineering. Engineering Department, City of Peoria, for complete information, write to Personnel Officer, Room 208 City Hall, Peoria, Illinois.

Wanted: Engineer-Estimator for heavy engineering contractor in Texas. Excellent opportunity. Please give experience and recent photograph. P-1219, Engineering News-Record.

Two college teachers to teach mechanics and/ or civil engineering subjects other than structural. Salary and rank dependent on qualifications. Location Northern New York. P-1137, Engineering News Record.

A new general engineering construction company now being organized in California requires a construction executive with ability to develop a sound producing company. Applicant must have engineering degree, necessary field and office experience and have thorough knowledge of business. Salary open to right person. P-1268, Engineering News-Record.

Positions Available for New York State Residents City of New Rochelle, N. Y. Assistant city engineer: (competitive) minimum qualifications: Degree in civil engineering from accredited college or university and 8 years public works engineering experience. Salary $6130-$7870. Must be New York State registered professional engineer. Junior engineer (competitive) minimum qualifications: degree in civil engineering from accredited college or university, or high school graduate plus acceptable equivalent combination of education and experience. Salary $5520-$7040. These positions carry three weeks vacation, sick leave, hospitalization, New York State Retirement System. Apply to Department of Personnel & Budget, City Hall, New Rochelle, N. Y. Telephone: NE 2-2021.

(Continued on page 126)

ENGINEERS — DESIGNERS
MECHANICAL, CHEMICAL & ELECTRICAL

To develop and design process installations. Numerous company benefits including liberal moving allowance.

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Personnel Dept.

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Send full resume, salary desired and references to

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Experienced in concrete—soils—asphalt paving.

Industrial and Highway Projects.

Openings in several grades, including opportunities for engineers and geologists (P.E. registration).

Long term employment and employee benefits.

TOLEDO TESTING LABORATORY
TOLEDO 2, OHIO

Graduate Civil Engineers

Not over 27 and single. Must have military training completed and interested in the building construction business, starting in the field. We offer opportunity for rapid advancement to ambitious, hard-working young men willing to accept responsibility. Starting salary $92.50 per week if unexperienced, with higher wages for those with some experience.

Send complete history data.

Martin K. Eby Construction Co., Inc.
610 N. Main, Wichita 5, Kansas.

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Highly responsible staff position, in headquarters of a company recognized world-wide for its achievements in chemical plant construction, for a graduate engineer with a thorough background in construction cost estimating and particularly well versed in the preparation of labor predictions for the erection of concrete, piping, insulation and instrumentation. He should also be experienced in the analysis of labor costs.

This is a challenging opportunity for the man who is seeking future growth and professional development. Please submit details of experience and salary desired. Replies held in confidence.

P-1246, Engineering News-Record
330 W. 42 St., New York 36, N. Y.

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Permanent Position For Qualified Men

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Chief Engineer for interview

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P-1273, Engineering News-Record
330 W. 42 St., New York 36, N. Y.

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Permanent Positions
Available in Florida and Pennsylvania
Excellent opportunities for advancement
Paid Vacation, Sick Leave, Hospitalization

Initial resumé should include experience, education, references and salary requirements

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WANTED:
Civil Engineers—Junior or Senior
Production man capable of site planning design

Site layout	Schools	Parks
Drainage	Housing	Highways, etc.

Location: New York and Hartford Offices

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OPENINGS At
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Send Resume Including Education, Experience, Salary Requirements and Availability TO:

Richard L. Shaw, *Personnel Director*

Michael Baker, Jr., Inc.
Consulting Engineers
Baker Building Rochester, Penna.

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Opportunity for structural engineer with 10 to 15 years structural design, detailing and checking experience on bridges and buildings. Vacancy in position as structural checker; salary open. Must be thoroughly familiar with shop details, concrete details, construction practice and engineering drawings.

Send experience history, references, statement of availability and salary requirements in first letter.

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Experienced structural steel detailers on all types of building and conveyor work. Long range program, good working conditions in a Consulting Engineers Office, paid holidays, vacation plan and health and accident insurance program.

Send complete information to:

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Young, aggressive and expanding Building Contractor offers unusual opportunity for top notch construction man with proven record. Our yearly volume is in excess of twenty million and covers the east, midwest and southern sections of the U. S. The man we are looking for must be capable of assuming full responsibility for the company's field operations. Written inquiries only will be considered from qualified applicants furnishing full experience resume and personal data.

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You can fill a desirable permanent position in McKee's enlarged Refinery, Metals or Industrial Divisions. Our expansion program gives you excellent opportunity for advancement in one of the world's largest engineering firms.

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Dresser-Ideco Company
One of the Dresser Industries
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BECHTEL

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Design experience in one or more of the following fields: Instrumentation and controls for Industrial Equipment, Refinery and Chemical Plant Processes, Steam Power Plants, Materials Handling Equipment, Metallurgical Process Equipment such as metallurgical furnaces, kilns, crushers, or related heavy machinery, heating and ventilating, or industrial plant layout.

ELECTRICAL —
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(Continued from page 123)

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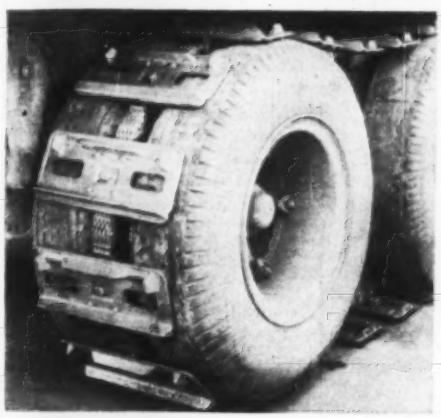

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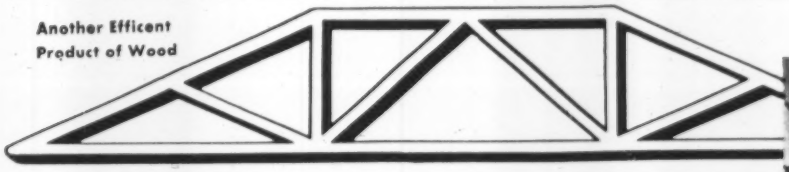

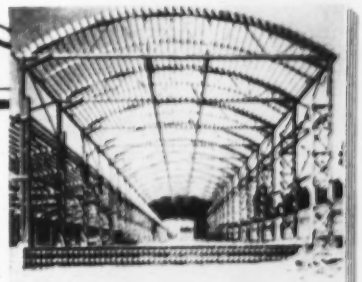

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ENR 566

Why Not More Arch Dams for the U.S.?

The decision of the Power Division of the American Society of Civil Engineers to devote its meeting sessions in Knoxville in June to a symposium on concrete arch dams is a wise one. And if, as a result, more engineers should be persuaded that worthwhile rewards await those who would master the intricacies of arch analysis, it would be a happy occasion, for the arch dam is a queenly structure that lends character to any river canyon which it may grace. More important, it offers economy and efficiency when the site conditions are right. Why shouldn't more arch dams be built in the United States?

In years past American engineers exerted considerable leadership in the arch dam field—building the Stevenson Creek experimental dam and developing the trial load method of analysis are two examples—but of late the real practitioners of the art are in Europe. Why this should be so may be attributed to a number of possible reasons—more good arch dam sites, difficult access to sites, which puts a premium on transport of materials, and a different balance between materials and labor costs. But unquestionably one of the reasons is also a liking for arch dams on the part of European engineers, and a willingness to undertake the much more onerous design task that an arch dam entails.

It is this extensive experience with arch dams in Europe since the war that makes the present time such a propitious one for a re-evaluation of this type of structure by U. S. engineers. In France, for example, since the war, 26 arch dams have been built to only 4 of gravity type. One of the arches, Tignes, rises to the unprecedented height of 594 ft. Another, Gage, has the remarkable average thickness of only 6 ft on a 125 ft height, made possible by using design stresses twice as high as ever before attempted.

Other countries, too, have been active in arch dam advancement. Portugal has built three on a single river, the Zezere. Italy has practically standardized on the arch for all of the recent dams in its northern Alpine region. And as the crowning single example, Switzerland has under construction what will be by far the highest arch dam ever attempted, with a crest 780 ft above the foundation.

Such a show of interest in arch dams suggests that their designers are convinced that quite definite advantages accrue from their use, and a number of these were cited by Andre Coyne, France's eminent dam authority, in one of his discussions before last year's International Congress on Large Dams. While any type dam can obviously be made safe against water pressure, Mr. Coyne emphasized that an arch is inherently strong against hydrostatic overloading—in fact, excessively strong were it not that the strength is provided at no increased cost. Uplift and sliding, the principal enemies of gravity dams, are of no consequence to an arch, and spillway and outlet capacities need not be provided with such great concern for possible overloads, in Mr. Coyne's opinion.

What other advantages does Mr. Coyne see in the arch, particularly in comparison with the gravity section dam? It has less mass, and therefore is less affected by concrete-setting temperatures. Cracks are less likely, and even most of those which do occur may be considered unimportant because the suppleness of the arch permits corrective readjustment. This high degree of indeterminancy also actually adds to the safety of the arch dam, thus, to a degree, making up for the difficulties and uncertainties it introduces into the design calculations. The indeterminate nature of arches is also held to cancel out the effects of unavoidable construction imperfections.

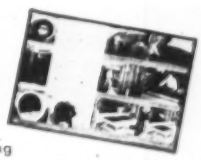
These are claims well worth considering, and there are others quite as arresting, which relate to cost as distinct from design. Thus while arches require more complicated formwork and richer, higher-strength concrete, the total volume of concrete is much reduced. In France this saving on concrete so far outweighs the richer mix factor that arch dams are considered to cost 30 to 60% less than gravity dams.

It is doubtful if such a large relative saving could be shown in a country such as the U. S., where labor costs are so much more significant than material costs. But savings and advantages there must be at times, for arch dams have been built in the past, and the Bureau of Reclamation is even now planning an arch of 520 ft (highest in the U. S.) at the Yellowtail site on the Big Horn River in Montana.

It seems likely that American engineers have avoided arch dams more because of the length and complexity of the design computations than for any other reason. But here again Europe may have aid to offer in the form of variants of the trial load procedure, of an inclined arch ring analysis and, most recently in Great Britain, of a so-called relaxation method using the procedure of successive approximations.

Because these different methods are now available and because they have been applied with success to arch dams in being or building, there is every reason to hope that a new and lively interest in this type of structure may yet appear in the United States. The symposium that the ASCE Power Division will hold in June is therefore welcome as a constructive force coming into operation at the right time.

Locked-in lining prevents sewer disintegration



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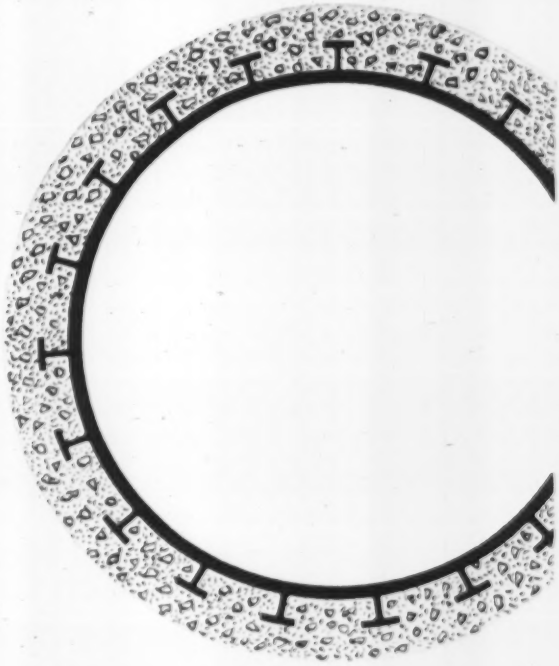

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